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YOUR INTERNSHIP—MAKING IT WORTH WHILE*

HARVEY AGNEW, M.D., F.A.C.P., F.A.C.H.A.†

FEW DECISIONS so profoundly affect the future of the medical student as his decision with respect to internship. His choice, judging from the experience of so many others, may determine the bent of his professional interest, perhaps his speciality, frequently the location of his practice, and, not infrequently, his choice of a life partner. While it is quite impossible to foresee what fate holds in store, nevertheless, it is most important that this vital transition period, this introduction to the diverse perplexities and responsibilities of clinical practice, be under the best possible associations. There is no question any more about the value of internship; in fact, it is accepted as an essential part of the student's training, and the rotating internship is now recognized as a necessary background in qualifying for a specialty certificate.

THE PURPOSES OF INTERNSHIP

An internship implies a two-sided bargain; therefore two viewpoints must be borne in mind: (a) that of the intern, and (b) that of the hospital. Unless each participant respects the needs of the other, dissatisfaction is bound to result.

(*a*) *The viewpoint of the Intern.*—The intern has one prime objective, namely, to supplement his more academic undergraduate training with that practical experience which he realizes to to be an essential qualification for practice. Fundamentally, his is still the educational viewpoint; he wants to see all that is visible, palpate everything palpable, and have an opportunity of participating in all those clinical procedures with which he anticipates being faced in the future.

(*b*) *The Viewpoint of the Hospital.*—The hospital exists primarily to heal the sick; therefore the chief value of the intern to the hospital lies in his service to the patient—by doing dressings, writing histories, carrying out clinical procedures, such as intravenous medications or catheterizations, assisting in the operating room, giving first aid in the emergency room, and, in general, functioning as a representative of the medical staff. Unless the intern is available for the various duties, and unless he does them faithfully and efficiently, he is of little or no value to the hospital. Actually, he may be a distinct liability, for it costs

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†Professor of Hospital Administration, University of Toronto; Chairman of the Committee on Approval of Hospitals for Internship of the Canadian Medical Association.

money to provide him with room, maintenance and laundry. Interns are notoriously hard on rubber gloves and syringes, and the hospital may be faced with serious forensic liability for his thoughtlessness or negligence. If he is married, as is often the case, he may spend the minimum of time required in the hospital.

Constant appreciation of these two viewpoints would prevent many misunderstandings.

In an effort to acquaint senior students with those hospitals in Canada which make every effort to provide educational opportunities for the intern, the Canadian Medical Association issues annually a list of hospitals in Canada which are approved for internship. In the United States the Council on Medical Education and Hospitals of the American Medical Association has been meeting a similar need for many years. Hospital staffs are co-operating most admirably in improving their services.

GETTING THE MOST FROM AN INTERNSHIP

One of the intern's greatest handicaps is his own lack of clinical perspective—because of lack of experience. The relative importance of various phases of his hospital work is difficult to evaluate. How can he know what will be most helpful to him in practice? He cannot foresee the repeated value to him in the future of some apparently trivial diagnostic point casually mentioned by his chief; he may not fully appreciate that it is infinitely more important for him to learn to diagnose and meet postoperative complications than to learn the exact technique of a pylorectomy or a lobectomy; it is difficult for him to realize that the experience with early signs and symptoms in the out-patient department will be much more useful in his office practice than most of his knowledge of highly complicated and specialized technique gained upstairs. There are many good and irrefutable reasons why the internship should be taken before entering practice, but its glorious opportunities would be more appreciated could the intern have had more previous contact with the problems of outside practice. One of the best interns at one of our large hospitals a few years ago was a man in his fiftieth year. Submerging his personal pride, he started in *de nova,* as an utter novice, learning the technique of the more recent clinical procedures, and, above all, finding an answer to the many diagnostic and therapeutic handicaps under which he had laboured for years.

This lack of clinical experience makes it all the more important for the intern to make a thorough and conscientious *self-analysis*—to study his needs, his inclinations, his weaknesses, and so endeavour to remedy the gaps in his medical and psychological preparation that he will be best fitted to compete in the tense struggle of professional life. Likewise, he should make a careful *job-analysis,* to clarify in his own mind his various duties and responsibilities, and to gain a clear concept of his relationship to the hospital. An active sympathetic intern committee can do much to help the intern staff in this respect; if there isn't an intern committee, or if it has gone into hibernation, respectfully ask the medical staff to correct the situation.

With no examinations to face, and with no prescribed curriculum to study, it is exceedingly easy for the intern to let his routine duties constitute his professional day, and early in his year jettison his good resolves to continue his reading. This is a sad mistake, for *combined* ob-

servation and reading makes the most effective form of study. Each case should constitute a text for a review of that subject; from the records and with the approval of one's seniors, studies might be made as to the effect of certain drugs or of surgical methods; every effort should be made to perfect oneself in the technique of clinical procedures, such as blood grouping, the handling of wet plaster, blood sugar estimations, the reading of X-ray films, paracentesis of the ear drum, spinal puncture, etc. In private practice one may not have technicians and colleagues to do these procedures for him. If one approaches history writing with an intelligent viewpoint, it becomes, not a routine drudgery, but a priceless opportunity to gain a most valuable knowledge of the background of disease. No autopsy, no matter how lacking in promise, should be missed if duties permit attendance. Osler extolled the humbling influence of the postmortem room on the self-assured clinician, and urged the young graduates to haunt the morgue. Take pride in your percentage of autopsy consents. In nearly all hospitals interns are welcomed to the staff conferences and monthly meetings; take in as many of these as you can, learn the problems of staff-organization, and welcome opportunities to prepare case reports for discussion.

THE VALUE OF TIME

We are prone as senior students and interns to talk of having to put in one, two, three, or more years at internship and residency. This is the wrong mental attitude. Much better would it be for the intern to form the habit of asking himself each night: "How much more do I know to-night than I did this morning?" The intern must get the viewpoint that a definite appraisement should be put upon his time. What is the monetary value of an average year in practice to him?—not his first year in practice, for he will have to go through that period anyway. A conservative estimate in normal times would be ten thousand dollars—probably much higher. Allowing for a few holidays, that is at least thirty dollars a day. In other words, he is justified in considering that during his internship period he is *paying the equivalent of approximately thirty dollars a day for his training and maintenance!* If the intern could keep this startling thought in mind he might approach his daily duties more seriously, with more concentration upon their future application, and with more endeavour to make every hour count.

RELATIONSHIP TO ATTENDING STAFF

Every hospital accepting interns should have a code of rules and regulations governing their duties and privileges. These should set forth clearly the place of the intern in the hospital organization. The intern must bear in mind that the patients are not his; a presumptuous intern who takes it upon himself in the middle of the night to "give 'm a quarter o' morph." (just like that) to somebody with brooding abdominal symptoms, is not likely to find his consideration for his superior appreciated. "When in doubt, telephone," is a good maxim to follow at ALL times, but particularly so with reference to private and emergency patients.

Larger hospitals will probably have a resident on the service who can take over the responsibility; but in quite a few hospitals taking interns there may be no resident. If the doctor in charge cannot

be located, endeavour to locate someone else with authority, the associate on the case, the chief of that particular hospital service, or, if the patient be a public patient, some attending doctor associated with that department. In case of extreme urgency, any doctor found in the building should be pressed into service, and, if visiting staff assistance cannot be obtained, or if the delay is likely to prove seriously detrimental, as in the instance of a haemorrhage or a precipitate delivery, the intern staff would be justified in handling the situation as best they can.

But no code of rules can adequately prescribe what may best be termed the "kindly spirit of the praeceptor." Fortunate, indeed, is that intern whose superiors look upon him as a junior partner—nay, as a son, to whom it is a pleasure to pass on the accumulated experience of years and to coach in the complex lore of the learned leech. Many leading physicians and surgeons, looking back upon their internship in later years, have considered their most valued and cherished memory to be that of their many informal discussions with their elders on the diverse problems of practice; their introduction to the "art" of medicine, such as the handling of recalcitrant or hysterical patients, dealing with relatives, "breaking the news," gaining the confidence of children, or the modus operandi of conducting a consultation, advice on how to get started in practice, or on how to keep office records and accounts.

And if this friendship, for so it should become, is to materialize, the intern must warrant the confidence and respect of his chief. Not only must he do his prescribed duties, but he must go the second mile as well; the chief, being human, is perhaps none too pleased to see a new intern just when the former one was beginning to be useful, but he soon begins to take a kindly interest in the newcomer, who keeps his records and work up to the minute, whose blood counts are on the chart, not somewhere in the pocket of his other coat, who doesn't always have to be called from the breakfast room to scrub, who can find a renal tumor by himself, or who is eager to conduct original investigations and to summarize and tabulate data on his own volition. The surgeon likes an intern who takes the trouble to read up the operation in advance, who knows the instruments by their correct names, who knows his chief's pet method of sterilizing the umbilicus, who can anticipate every step of the operation, who doesn't pass him the scissors when he urgently needs a pair of forceps, and who doesn't invariably put the needle into the needle-holder the wrong way. He will whoop for joy to find an apprentice who is more interested in pre- and post-operative care than in getting his itching fingers around a scalpel.

No; staff appointments are very seldom indeed the result of favouritism—the usual cry of the lame duck. Not long ago the chief of a large teaching hospital told the writer that his hardest task was to find junior men of sufficient calibre to warrant their appointment to the hospital staff! He did not insist upon brilliance so much as upon a conscientious devotion to duty, a willingness to study, and evidence of sound judgment and independent thought.

CRITICAL ATTITUDE TOWARD MEDICAL STAFF

One feels considerable sympathy for the attending staff, for it is doubtful if there is any more critical person to please

than the intern. Fresh from school, with the latest research data in his mind, he is very prone to feel disdain for the time-honoured technique and the diagnostic methods of yesterday. Filled with enthusiasm for certain theories or methods, he finds it difficult to appreciate merit in other opinions, and only when repeated observation proves to him that excellent results can be accomplished by widely opposed approaches, does his viewpoint broaden. Herein lies one advantage of including in the intern staff graduates of various medical colleges.

Many hospitals have on their staffs a number of general practitioners; sometimes there is a general practitioners' division. This is as it should be, for it is difficult to take full advantage of the latest advances in medicine without some hospital facilities. General practitioners should have hospital privileges, the extent to be determined by the training and ability of the individual. Because these men have not had the opportunity to learn the technical procedures and interpretations familiar to the specialist, their ability may be underestimated and their methods criticised. Actually, most general practitioners do broader reading in medicine than do most specialists; their approach to an obscure diagnosis, taking into consideration the patient as a whole, the mental factors, the environment, business worries, etc., may be amazingly accurate. The intern is fortunate who has intimate contact with a number of good general practitioners.

What some practitioners may lack in laboratory grounding they more than make up in clinical experience; and they have a clinical judgment founded upon years of training of the eyes, the fingers, the ears, and even the nose, which all the test tubes in Christendom could not produce. The best clinical judgment results from combined bedside observation and laboratory study; the medical school rightly emphasizes the latter (although it does not neglect the former), largely because if the student does not get a laboratory training at college he will never get it; therefore the intern should miss no opportunity of picking up the least crumb of bedside wisdom.

RELATIONSHIP TO SUPERINTENDENT AND NURSES

Because of the intern's responsibility professionally to the medical staff, his relationship to the other members of the hospital family may not be clear. It should be borne in mind that in matters of discipline he is responsible to the administrator, by whom, as a rule, he is appointed. With respect to the nursing staff, the relationship is not so clearly defined. When carrying out the instructions of the visiting staff, or when doing dressings, the nurses follow his directions; but the senior nurses, particularly the supervisors, cognizant of the inexperience of the junior interns, are prone to use their own judgment in many matters—and rightly so, too, for interns are apt to order narcotics when simple sedatives will suffice, or order catheterization of a child when a motherly word from the nurse in the proper setting will start proceedings. The intern going on a new service would be well advised to have a frank talk with the supervisor in charge, for life is much more pleasant if she be a friend. Supervisors do not like interns who are officious, who are inconsiderate of the nurses' timetable, who leave drug or chemical stains on the bedding, who waste gauze, who always write "stat." but only come themselves on the third call, and who are not adept at concealing

their amorous interest in certain pupil nurses.

In conclusion, keep in mind that only a proportion of patients are hospitalized. Hospital experience is not parallel to that of private practice, with the possible exception of the out-patient department, which is a close reflection of office practice. Years ago, the Commission on Medical Education made this significant comment in its report: "Hospitals are concerned so largely with serious disease and surgical conditions, that the intern often secures an erroneous impression of the medical needs of the community, which make him unduly reluctant to enter practice at a distance from hospital centers." Also, because most of the active workers on general wards are specialists, do not gain the impression that early specialism is the only road to success. Above all, never cease to be a student, for, as reads the motto of Budaeus: "Time not given to study is lost time."

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BLOOD DYSCRASIAS OF INTEREST IN SURGICAL DIAGNOSIS*

J. R. EVANS, 5T2

INTRODUCTION

Blood Dyscrasia is a rather all-inclusive term, the literal interpretation of which is "a depraved condition of the blood due to general disease". In this presentation, discussion has been restricted to the disorders of the *formed* elements of the blood—the excesses and deficiencies of the red blood cells, white blood cells and platelets, with brief reference to the lymphomas and multiple myeloma, where they are inter-related.

It is trite to say that all blood dyscrasias are of concern to the surgeon. However, there are certain disorders which are of particular interest in that:

(a) They imitate the symptomatology of surgical lesions.
(b) They are indicative of the existence of surgical lesions.
(c) They are sequelae of surgical procedures.
(d) They are amenable to surgical treatment.

Congenital hemolytic icterus, idiopathic thrombocytopenic purpura and those disorders which may be cured or ameliorated by operative procedures, have been dealt with at length in the current literature and are beyond the scope of this discussion.

SYMPTOMATOLOGY IMITATING SURGICAL LESIONS

Blood dyscrasias may produce symptomatology similar to, or indistinguishable from, the manifestations of surgical lesions. The problem in diagnosis may be extremely difficult unless clinical examination and interrogation have been thorough and have been substantiated by careful hematological investigation. However, one must not rely unconditionally on examination of the blood, for, in the early stages of most of the dyscrasias, the characteristic findings may be absent, or they may be masked by a secondary response of the hemopoietic system to blood loss, infection, etc.

Certain symptoms are features common to many of the blood dyscrasias which we are considering. They are bleeding, mass formation and thrombosis.

Hemorrhagic manifestations, either externally, or in the form of bleeding from the respiratory, gastrointestinal or genitourinary tracts, may be the factor which first brings the patient before the diagnostician. It is most important that the focus of attention should not be narrowed to pathology at the site of bleeding without eliminating the possibility of an underlying disorder of the blood. Unnecessary operations have been carried out on nearly every system in the body in the belief that the local source of bleeding was the primary pathology.

Also, it must be remembered that, in addition to the purpuras, hemophilia, and the specifically hemorrhagic states, bleeding is a very common manifestation, and may be the presenting symptom of many of the blood dyscrasias. It may

*Adapted from a paper read before a meeting of Alpha Omega Alpha, January, 1952.

be seen in aplastic anemia, pernicious anemia, polycythemia, myelophthisic anemia, acute leukemia, the terminal stages of chronic leukemia and even infectious mononucleosis.

The second common feature is mass formation. This may perplex the surgeon in the differential diagnosis of a mass which is palpable or which is the source of pressure symptoms. The two forms most commonly seen are hematomata and lymphoid masses. The former are associated with blood dyscrasias producing bleeding tendencies, particularly hemophilia and the purpuras. The lymphoid masses are seen in the leukemias, lymphoblastomas, and, less frequently infectious mononucleosis. The diversity of situation of the tumours may make the diagnosis even more difficult, for example, one-third of the cases of lymphosarcoma originate *outside* lymph nodes. In chronic lymphatic leukemia enlargement of tonsils, salivary and lachrymal glands may be seen. In *acute* enlargements of the breast or ovary, one should always beware of the possibility of leukemia, although lymphosarcoma and Hodgkin's disease, as well, may be responsible for such tumours. The testes or tonsils may be enlarged in multiple myeloma, and the absence of skeletal involvement renders diagnosis very difficult. Multiplicity of tumours should always suggest generalized lymphogenous or myelogenous pathology.

The third feature common to many blood dyscrasias is thrombosis. In polycythemia vera, leukemia and, to a lesser degree, the hemolytic anemias, arterial and venous thrombosis may occur in diverse sites throughout the body, the spleen being involved most frequently. In multiple myeloma, the sluggish viscous circulation predisposes to intravascular thrombosis which may be accompanied by Raynaud's phenomena in the extremities. Even platelet deficiency states are not exempt from thrombosis. Singer reviewed a rare condition of unknown etiology which he labelled thrombotic thrombocytopenic purpura. This syndrome of severe anemia and thrombocytopenia was characterised by a welter of symptoms due to widespread thrombosis in arterioles and capillaries throughout the body. The clinical pictures produced by infarction in the various locations may give rise to a multiplicity of symptoms that would grace a collagen disease.

In addition to these general manifestations, symptomatology of the blood dyscrasias may imitate the picture produced by lesions in many of the organ systems.

Gastrointestinal Disturbances

Abdominal disturbances or, more specifically, those referable to the gastrointestinal system, are common in the blood dyscrasias and may be extremely difficult to differentiate from the commoner surgical abdominal states.

In pernicious anemia symptomatology referable to the gastrointestinal tract is exceptionally common and characteristically indefinite, simulating at times gastric neoplasm, peptic ulcer or gall bladder disease. Investigation often tends to substantiate one or other of these misdiagnoses. Gall bladder disease is common to 25 per cent of pernicious anemia patients and, in addition, cholecystograms during relapse often show filling defects which disappear completely when the anemia is controlled. These are attributable to impaired liver function. Visualization of the stomach often reveals interesting pathology. Regler et al.,

report polyps in 7.1 per cent and gastric carcinoma in 8 per cent of their series of 200 cases. Rarely muscular hypertrophy at the pylorus may give rise to a pseudo-tumour and symptoms of partial obstruction. The pernicious anemia patient may complain of paroxysms of severe abdominal pain, with intestinal upset and rigidity. This is attributed by some to episodes of hemolysis while others incriminate neurological changes.

The hemolytic anemias in crisis manifest the severe crampy abdominal pain of rapid blood destruction, accompanied frequently by the sharp, stabbing, epigastric and left upper quadrant pain of perisplenitis, due to splenic infarction. Associated gastrointestinal upset, abdominal tension and shock have not infrequently misled the investigator to a diagnosis of perforated peptic ulcer, intestinal obstruction, or other surgical emergencies requiring operative treatment. This condition is found in its most fulminating form in Lederer's anemia, but commonly it is seen in congenital hemolytic icterus, sickle cell anemia, as well as in the symptomatic hemolytic anemias. However, the established diagnosis of a hemolytic state does not rule out true abdominal pathology. In congenital hemolytic anemias over two-thirds of patients have cholelithiasis manifested often by frequent attacks of biliary colic. This aspect of the disease may first bring them to the doctor. Treatment of the stones by cholecystectomy alone is inadequate, because they tend to recur in the common bile duct unless the spleen is removed at the same time or shortly after. In many cases of biliary colic in congenital hemolytic icterus interference is not warranted because the stones are of the pigmentary type and pass themselves without difficulty. However, if splenectomy is performed, gall stones should be searched for and, if found, should be eliminated either by opening the gall bladder or by crushing them digitally.

In the course of aplastic anemia, vague abdominal complaints may be associated with bleeding from ulceration of the bowel.

Rarely does a hypochromic microcytic anemia produce abdominal complaints despite its common occurrence. However, in reference to the alimentary tract, Waldenström has found the Plummer Vinson Syndrome to be the commonest disease of the esophagus in Sweden (twice as common as carcinoma). This disease shows a constant relationship to low plasma iron levels, but anemia is not present in all cases.

In polycythemia vera thrombosis of mesenteric veins and arteries, or splenic infarction may produce the picture of acute intestinal obstruction, peritonitis, perforated ulcer or appendicitis. Partial or complete thrombosis in the portal venous system may result in abdominal ascities or massive gastrointestinal hemorrhage from varices of the porto-caval collateral anastomoses. Small thromboses with secondary ulceration of the bowel mucosa are postulated to account for some of the confusing symptomatology. This explanation is believed by some to be the basis for the unusually common occurrence of duodenal ulcer. (8 per cent in polycythemia; 2.2 per cent in a control series).

Leukemic changes in the gastrointestinal tract are of two varieties, specific and non-specific. The specific changes are due to local infiltrations in the form of polypoid tumours and constricting bands, or due to diffuse involvement of the whole tract or a single subdivision

of it (e.g. the appendix). Pyloric or intestinal obstruction is not uncommon and intussusception may occur secondary to a lymphoid nodule in a Peyer's patch. The symptomatology resulting from specific changes is rarely striking and usually appears late in the course of the disease. The non-specific changes include ulceration and hemorrhage. Ulcers occur over the areas of leukemic infiltration resulting in perforation if the excavation is deep, or becoming secondarily infected to give a picture of enteritis like typhoid fever. Hemorrhage may be local at a site of ulceration or diffuse due to thrombocytopenia. These non-specific changes are responsible for most of the gastrointestinal complaints in the leukemias and may appear early in the course of the disease.

In acute leukemia and chronic myelogenous leukemia non-specific changes predominate and any specific features are usually asymptomatic. In chronic lymphatic leukemia specific changes are much commoner. Diffuse involvement of the stomach and intestines with little or no change in the blood picture has been labelled *pseudoleukemia gastrointestinalis,* and may give rise to some difficulty in diagnosis. However, the clinical picture stems from non-specific changes in most cases. Monocytic leukemia may present with nodules in the stomach, constricting tumours of the rectum, infiltration of the ileocaecal region, or even perforation of the appendix.

Lesions similar to the leukemias may be seen in the lymphoblastomas—Hodgkin's disease, lymphosarcoma, reticulum cell sarcoma and follicular lymphoma. Although these tumours are described as rarely involving the gastrointestinal tract, it has been reported that lymphosarcoma is three times as common as carcinoma of the small bowel, and that primary Hodgkin's disease of the stomach may comprise up to 2 per cent of gastric malignancies. The symptomatology and radiographic appearance produced by these lymphoid tumours is remarkably similar to that produced by carcinoma, minor distinctions being appreciated chiefly in retrospect. Pathologically significant is the tendency of these tumours to remain localized rendering them more amenable to surgery. Radical resection and post-operative radiation give overall results which compare with the diffuse infiltrating type of carcinoma. A surprisingly large number of patients show no evidence of recurrence with this management.

The majority of the hemorrhagic dyscrasias do not present abdominal complaints other than bleeding from the gastrointestinal tract. However, there are two notable exceptions. Henoch's purpura, an anaphylactoid non-thrombocytopenic form of purpura, occurring chiefly in youngsters is characterized by sero-hemorrhagic effusion into abdominal viscera, particularly the bowel wall. Clinically, periumbilical colic of nocturnal occurrence is associated with severe enteritis or stubborn constipation. Intussusception and bowel obstruction may result. Intussusception is more often diagnosed than it occurs, because the submucous hematoma may form a palpable mass, and it may rupture into the lumen to give massive melena. Gastrointestinal symptoms frequently appear before any visible purpuric manifestations and, needless operations may be performed on this type of case. Henoch has stressed that rheumatoid joint pains are a common precursor of the abdominal complaints and may serve to caution the diagnostician.

The acute abdomen in hemophilia is a particular problem because of the high operative mortality rate (35 per cent) for the common pathological states, and because of the difficulty in diagnosis offered by intraabdominal and retroperitoneal hematomata. Perforated peptic ulcer, bowel obstruction and other surgical emergencies may be imitated by hemorrhage into the peritoneal cavity, mesentery or bowel wall. Commonest of all is hematoma of the ilio-psoas muscle, closely simulating acute appendicitis when on the right side. The *principle* to be followed in the management of hemophiliacs is that the acute abdomen from hemorrhage is commoner than from the usual causes, and therefore, in view of the high operative mortality, treatment should be conservative until the diagnosis is absolute.

Genito-Urinary Disturbances

The genito-urinary tract rarely presents diagnostic problems to the surgeon other than the investigation of hematuria or hemoglobinuria. Even though the diagnosis of a blood dyscrasia may be established, as in the case of hemophiliacs where over 90 per cent show at least one bout of hematuria, investigation must be undertaken to rule out local disease if bleeding is repeated.

In leukemia, hematuria is again the commonest symptom, resulting from thrombocytopenia in acute leukemia, and congestion due to enlarged nodes in chronic lymphatic leukemia. Infiltrations of the kidney are frequent, but symptoms are rarely produced. Ureteral obstruction may occur.

Priapism may be the initial symptom in myelogenous leukemia. It is due to thrombosis or stasis of leukocytes in the corpora cavernosa.

Hasenbusch reports three cases in which prostatic enlargement was the presenting difficulty. Pathological sections revealed benign hypertrophy with marked lymphocytic infiltration. In all three patients, chronic lymphatic leukemia subsequently developed.

Mediastinal and Pulmonary Disease

The commonest symptoms referable to the chest are those produced by enlarging mediastinal lymph nodes in leukemia and the lymphoblastomas. In acute leukemia, the thymus may also exert compression symptoms before the blood picture is recognizable.

Symptoms of pulmonary disease, cough, hemoptysis, pleural effusion, infection, cavitation and atelectasis, may all be seen in leukemia and the lymphoblastomas. Some symptoms are of embolic origin, while others are due to nodular or massive infiltrations of the lung or bronchial tubes, appearing not unlike primary or secondary carcinoma.

Massive hemoptysis or hemothorax, occurring in hemophilia or polycythemia *is* of grave significance. Rarely is this seen in the purpuras.

Neurological Disturbances

The neurological symptoms produced by the blood dyscrasias are non-specific. Hemorrhage and thrombosis may be seen in polycythemia and leukemia. Early leukemic infiltrations of the brain are not uncommon and may be difficult to distinguish from the picture of brain tumour. Intracranial hemorrhage is common in the purpuras, but rare in hemophilia.

Paraplegia, radiculitis and peripheral neurological changes are common in the leukemias, lymphoblastomas, and multiple myeloma due to either vertebral collapse, or arterial thrombosis.

Bone and Joint Disease

Articular symptomatology often occurs in the blood dyscrasias. The rheumatoid state may be simulated by painful joints, with or without effusions, in the early stages of sickle cell anemia, anaphylactoid purpura, hemophilia, multiple myeloma and acute leukemia. In Schonlein purpura the effusions are periarticular and may precede visible purpuric manifestations. In hemophilia the joint simulates infective arthritis, being exquisitely tender and distended with blood, but with no apparent discolouration. Spontaneous hemarthrosis was seen in 90 per cent of one series of hemophiliacs, and in many, repeated episodes led to chronic articular disease.

Erosion and thinning of cortical bone by hyperplastic elements of bone marrow is seen in hemolytic anemia, polycythemia, the leukemias, lymphomas and myelophthisic states. This process produces severe pain and deep bony tenderness and may be responsible for pathological fractures, collapse of vertebrae, dislocations or deformities of bone growth.

Leukemic changes, in particular, may simulate acute osteomyelitis, Legg Perthe's Disease and osteogenic sarcoma on various occasions.

Chloroma and solitary lymphoblastoma of bone are rare, but any evidence of osteolysis or myelosclerosis should bring lymphoid disorders into consideration.

Extensive bleeding around the bone in hemophiliacs may give rise to a soft tissue swelling, with the radiographic picture of bone sarcoma. Amputations have been performed on several of these cases of hemophiliac pseudotumour.

HEMATOLOGICAL MANIFESTATIONS OF SURGICAL STATES

Microcytic Hypochronic Anemia

The importance of the recognition of the iron deficiency type of anemia as evidence of pathological blood loss needs no elaboration. Often this anemia is the only early manifestation of malignant growths.

Normocytic Anemia

Although the exact nature of its pathogenesis is not clear, Beizer stresses the importance of this anemia in the diagnosis of abdominal neoplasm. In the late stages of some malignant growths, a leukoerythroblastic anemia may indicate metastases to bone marrow before radiographic changes are detectable.

Macrocytic Anemia

This anemia may be seen with disorders in various sites of the gastrointestinal tract. The discovery of a macrocytic anemia in a patient in the cancer age group should stimulate investigation of the stomach. The chronic gastritis and achlorhydria associated with carcinoma of the stomach may result in an anemia morphologically similar to pernicious anemia, but usually refractory to liver therapy. In addition, the incidence of gastric carcinoma in patients with true pernicious anemia varies from three to five times the general overall incidence. For this reason routine biannual barium series are recommended by some investigators.

Macrocytic anemias may be seen with intestinal lesions associated with malabsorption or "intestinal hurry". Examples of this are seen with tuberculous stricture of the ileum, multiple intestinal anastomoses following appendicitis, bowel

obstruction and fecal fistulae, regional ileitis, neoplasms of the ileum and colon, and biliary fistulae. Assays on bowel content reveal reduced quantities of Castle's anti-pernicious anemia factor in nearly every case.

Hemolytic Anemia

Symptomatic hemolytic anemia has been reported by several authors in association with dermoid cysts and ovarian tumours. In some cases removal of the tumour arrested the hemolytic process, while in others additional splenectomy was required.

Davis intimates that crises in cases of congenital hemolytic icterus may be precipitated by cancer of the lung, pancreas or stomach.

Polycythemia

Polycythemia may also be symptomatic. Erythrocytosis occurs in congenital heart disease and pulmonary arterio-venous fistulae. Some of these cases are amenable to surgical correction. Polycythemia, coterminous with intracranial space-occupying lesions, is also reported. Surgical treatment of cases of subdural hematoma and cerebellar hemangioblastoma was associated with disappearance of the polycythemia. However, attention should be drawn to the fact that papilledema may exist in polycythemia vera in the absence of an intracranial neoplasm.

Leukemoid States

Beizer states that over 50 per cent of abdominal neoplasms in the early stages are associated with a leukocytosis (over 10,000 WBC/cu.mm.). Immature forms of leukocytes indicate invasion of the bone marrow late in the course of secondary spread.

Bickel reports two patients in whom the typical blood picture of lymphatic leukemia was gradually replaced by lymphopenia as cancer of the stomach developed. Much later, a leucoerythroblastic picture demonstrated involvement of the bone marrow. He attributed the early leukemoid state to infiltration of cancer cells into the regional lymph nodes.

CERTAIN BLOOD DYSCRASIAS MAY RESULT FROM SURGICAL PROCEDURES

Following splenectomy and, to a lesser degree, all operations, a rise in blood platelets is noted. Thrombolic and embolic phenomena are not uncommon.

Following gastric surgery, certain anemias may result. Iron deficiency anemia was reported by several authors in nearly 50 per cent of the patients who had undergone gastro-enterostomy or complete or partial gastrectomy. The occurrence of a macrocytic anemia was much less common in these series even in the operations in which all the gastric mucosa was removed. It usually did not develop until two or three years postoperatively.

The majority of the anemias produced by resection and anastomoses of the intestine are of the iron deficiency type. However, macrocytic anemias are also observed, especially when the lower part of the small intestine is the segment involved. Some of these macrocytic anemias are associated with steatorrhea, but many occur in the presence of an apparently normal digestive process. The pathogenesis is not clear in the latter cases, but Witt reports macrocytic anemias in experimental animals in which a blind loop of bowel, left distal

to an anastomosis, accumulated faecal material. If the blind loop was left proximal to the anastomosis, it remained devoid of intestinal content and no anemia developed.

CONCLUSION

Although this discussion has been concerned for the most part with the more unusual aspects of the blood dyscrasias, it is hoped that it will serve to remind the surgeon of the importance of routine hematological study in the diagnosis and follow-up of his cases.

ACKNOWLEDGEMENT

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Professors may be divided into four classes. There is, first, the man who can think, but who has neither tongue nor technique. Though useless for the ordinary student, he may be the leaven of the faculty and the chief glory of his University. A second variety is the phonographic professor who can talk but who can neither think nor work. Under the old regime, he repeated year by year the same lecture. A third is the man who has technique, but who can neither think nor talk; and a fourth is the rare professor who can do all three, think, talk and work.

W. Osler

HYPERTHYROIDISM

G. B. PAGE, 5T2

ANATOMY

Gross Anatomy

The thyroid, largest of the ductless glands, is normally concealed by overlying infrahyoid and sternocleidomastoid muscles. It lies in the lower third of the neck and partially encircles the upper trachea and lower larynx. It has a butterfly configuration with two lateral irregularly pyramidal lobes joined by an isthmus which usually covers the second and third tracheal rings and joins the lateral lobes at the junction of their middle and lower thirds.

In 50 per cent of people an upward prolongation of thyroid tissue, the pyramidal process, arises from the isthmus or anterior medial aspect of a lateral lobe and extends cordlike to the hyoid bone. In some instances it has no connection with the gland proper. It is surgically important because the usual transverse incision does not always expose it. Should it remain it almost invariably enlarges producing a disfiguring deformity to annoy the patient and plague the surgeon. The lingual thyroid is another example of ectopic thyroid tissue and indeed may comprise the functioning gland in its entirety. In addition, aberrant thyroid may occur retrosternally and as an extra lobe near the angle of the jaw.

The thyroid gland is completely encased in a fascial sheath derived from the middle layer of deep cervical fascia. This so-called surgical capsule contains the thyroid gland, upper extremity of the trachea, cricoid and thyroid cartilages, often all four parathyroid glandules and the recurrent laryngeal nerves. The carotid sheath is usually lateral to the normal gland—posterior or posterolateral to the enlarged gland. The recurrent laryngeal nerve normally runs in the tracheoesophageal groove (either anterior or posterior to the inferior thyroid artery) and for the most part lies medial to the gland. It lies posteriorly only in relation to the inferior poles of the lateral lobes.

Of clinical importance is the thyroid's firm attachment to the trachea, cricoid and thyroid cartilages by the fascial sheath and fibrous bands. Consequently, it follows the movements of these structures (as on swallowing) and identification of thyroid tissue is facilitated.

Microscopic Structure

The gland is enveloped by its true capsule—a very thin, transparent, fibroelastic structure inseparably attached to the gland parenchyma. It gives off numerous septa which with blood vessels, lymphatics and nerves, ramify through and subdivide the parenchyma into portions of various shapes joined by interconnecting bars of thyroid tissue.

The basic structural unit is the follicle—a closed sac of varying size and shape lined with a single layer of epithelial cells which are normally cuboidal or low columnar (secretory phase). In the active gland (hyperthyoidism) the follicles are smaller; the epithelium high columnar and the colloid thin and poorly staining. In contrast the sluggish or resting gland contains follicles distended with deep staining viscid colloid and lined with flattened epithelium.

Blood Supply

The arterial blood supply is exceedingly generous. The superior and inferior thyroid arteries on each side are constantly augmented by vessels from the trachea and esophagus and occasionally by the "thyroid ima" directly from the aortic arch. Thus, in subtotal thyroidectomy, the rich collateral circulation permits ligation of all four main arteries with little or no impairment of circulation to the remainder of the gland, provided the gland remnant is not detached from the side of the trachea.

The venous return runs from the parenchyma to the subcapsular plexes and thence to the inferior, middle and superior thyroid veins. As these vessels drain directly into large venous trunks in the root of the neck and mediastinum, they must be securely ligated or otherwise much air may be aspirated into the vein with resultant air embolism.

Lymphatics

The rich lymphatic circulation drains to the deep cervical nodes; to lymph nodes anterior and lateral to the trachea and occasionally directly into the subclavian vein.

PHYSIOLOGY

The thyroid is one of the most labile organs in the body and is not a fixed structure any more than is the breast or endometrium. Within the confines of normalacy, it is continually changing from a state of hyperplasia and hypertrophy to one of involution. In the human these changes are patchy in character and the development of so-called adenomata is understandable.

The gland's tremendous affinity for iodine (the active principle of the thyroid containing 65 per cent iodine) is the basis for the use of radioactive iodine in diagnosis and therapy. With increased glandular activity there is increased uptake of radioactive iodine which can be checked with a Geiger counter and compared with normal levels.

The administration of thyroxin, the active principle of the thyroid, results in an increase in the basal metabolic rate (B.M.R.) and in physiological phenomena that would be expected to result from an increase in the rate of the transformation of energy, as follows:

(a) Increase in pulse rate and pressure.
(b) Increase in minute volume output of the heart.
(c) Increase in body surface temperature and perspiration.
(d) Loss of weight (often in spite of greatly increased intake of food).
(e) Decreased blood cholesterol.

Thyroxin also has been shown to have an effect on the heart not attributable to any effect through the nervous system. If it is given in large enough doses for a sufficient length of time, auricular fibrillation eventually results.

The basis of thyroid activity is the pituitary-thyroid axis. Normally a decrease in circulating thyroxin stimulates the anterior pituitary to increase its output of thyrotropic stimulating hormone (T.S.H.). The T.S.H. in turn causes hypertrophy, hyperplasia and increased vascularity of the thyroid with a resultant increase in thyroxin synthesis. Normally the increased circulating thyroxin depresses the anterior pituitary's output of T.S.H. This circular or push-pull effect is what has been termed the pituitary-thyroid axis and in the majority of people maintains a normal balance throughout life according to bodily needs.

T.S.H. also produces exophthalmos in some animals, particularly if the thyroid is first removed. This exophthalmos is due partly to increased intraorbital fluid and partly to increased fat in extraocular muscles and orbital fibro-fatty tissue. Degeneration and increased fat content of skeletal muscles is also found in the experimental animal, particularly in the quadriceps muscles.

There is increased thyroid activity (thence increased iodine requirements) at puberty, in menstruation, during lactation and at the menopause. Thus the female gland undergoes greater variations in activity than the male and it is not surprising to find that the female gland outweighs that of the male and that thyroid disease is five times more common in the female.

ETIOLOGY

The etiology of hyperthyroidism is unknown. It is postulated that the fundamental occurrences producing the disease are as follows. Stimuli arise in the hypothalamus which promote activity in the anterior pituitary thus creating an excessive output of T.S.H. The T.S.H. causes hyperplasia of the thyroid and excessive synthesis of thyroxin, without the excess thyroxin depressing the anterior pituitary. But why there should occur the occasional rampant effect of T.S.H. without the depressing effect, no one has yet explained.

Many people believe the disease is related to the emotional state and indeed occasionally the onset is sudden and the course fulminating following a definite emotional trauma. However, the disease may be chronic or marked by remissions and exacerbations.

In the case of the toxic adenomatous goitre it is believed by some that the hyperfunctioning adenoma is alone responsible.

In spite of much speculation, many theories and extensive laboratory investigation, the etiology of this disease remains obscure.

CLINICAL CONSIDERATIONS

Clinically hyperthyroidism is classified as follows:

(a) Diffuse toxic goitre
OR
Primary hyperthyroidism
Exophthalmic goitre
Graves' disease
Basedow's disease

(b) Nodular toxic goitre
OR
Secondary hyperthyroidism
Toxic adenoma
Hyperfunctioning adenomatous goitre

Diffuse Toxic Goitre

Usually it occurs in the 20 to 40 age group although rarely it may arise early in life.

The patient complains of tremour, nervousness, heat intolerance, tachycardia, sweating, suffusion, weight loss and in many cases frequent emotional outbursts and frequent purposeful movements.

The thyroid is found to be diffusely and symmetrically enlarged in 90 per cent of cases. The hyperplasia results in increased tension within the capsule so that the gland is very much firmer than soft colloid goitre but not quite as hard as cancer or acute thyroiditis. Exophthalmos and lid-lag are present in a large percentage. A bruit and/or thrill are often found over the gland. The patient's pulse pressure and rate is in-

creased and in 20 per cent auricular fibrillation is present.

Laboratory investigation reveals an increased B.M.R., increased blood protein-bound iodine level, increased iodine uptake by the thyroid and lowered blood cholesterol.

Occasionally diarrhea may occur and in badly neglected cases the patient may go into a gastrointestinal crisis with vomiting, diarrhea and intense restlessness. Rarely this may go on to a stage of profuse sweating, gray pallor, falling blood pressure and jaundice ending in sudden death or spontaneous recovery from the crisis.

The natural course of this disease is usually one of remissions and exacerbations. However, it may burn itself out or pursue a rapid fulminating course ending in early death. Rarely it is chronic.

Nodular Toxic Goitre

The patient is usually over 40 years of age when he first notices symptoms. But he has usually had a goitre for many years.

Symptoms usually come on slowly and it may be many months before they become significant. Heat intolerance, loss of weight, weakness, fatigue, nervousness, excessive sweating and tachycardia eventually bring the patient to seek medical advice.

No bruit or thrill is elicited over the irregularly enlarged thyroid and exophthalmos is very uncommon.

The laboratory findings are the same as outlined for diffuse toxic goitre.

In this type of hyperthyroidism it is as if the patient were receiving a continuous and gradually increasing dose of thyroxin twenty-four hours a day, subjecting all body tissues to continuous overwork until finally visceral degeneration occurs. Consequently, in these patients, while the goitre can be removed and function returned to near normal, the long-range visceral damage cannot be reversed.

Auricular fibrillation and severe cardiac damage are not uncommon in these patients. In fact, the cardiac disturbance may so overshadow the clinical picture that the hyperthyroidism may be overlooked unless kept in mind.

The natural course is usually steady and progressive with death due to visceral degeneration, particularly in the heart and liver.

Differential Diagnosis

Distinguishing between the aforementioned clinical varieties of hyperthyroidism may at time be difficult for it is not uncommon for the patient to present with a mixed picture of the two. In addition, the atypical case of hyperthyroidism may require differentiation from the following:

1. Essential hypertension.
2. Neurosis, neurasthenia or comparable fatigue states.
3. Tuberculosis.
4. Diabetes.
5. Chronic infections.
6. Acromegaly.
7. Pheochromocytoma.

These diseases may at times present with symptoms of increased body surface temperature, increased sweating, nervousness, loss of weight and tachycardia. In addition to the history, laboratory tests more or less specific for the disease in question, aid considerably.

Laboratory Aids in Diagnosis

While diagnosis is primarily based on history and physical examination, the

following determinations are often confirmatory.

1. B.M.R.
2. Blood protein-bound iodine level.
3. Radioiodine tracer uptake studies.

Jaffe and Ottoman compared the accuracy of these three techniques on 152 patients suspected of having hyperthyroidism and by considering the results with reference to the presenting clinical picture and subsequent clinical course, they found:

1. B.M.R. was accurate in 2/3 of cases with a high incidence of "false high" results probably due to the technical difficulties of the test and/or improper preparation of the patient and/or failure of the patient to follow orders prior to the test. The normal range was considered as + 20 to −20.

2. Blood protein-bound iodine level, with a normal of 5-7 micrograms per 100 c.c., was accurate in 4/5 of cases. The error was probably due to technical difficulties in this very sensitive laboratory procedure.

3. Radioiodine tracer uptake studies were accurate in 95 per cent of cases with the 5 per cent error occurring in borderline cases in which a therapeutic trial settled the diagnosis. The normal uptake was considered to be 15-30 per cent, while over 35 per cent was toxic and less than 15 per cent abnormally low. (N.B. At the Toronto General Hospital normal uptake is considered as 20-40 per cent, with hyperactivity above 45 per cent and hypofunction less than 20 per cent.)

In all three tests "false lows" occurred frequently when the patient had had previous therapy with iodine or thiouracil derivatives.

The B.M.R. will still remain the most important diagnostic aid throughout the country because of its ready availability. Blood iodine studies are very delicate and notoriously difficult and not available to smaller centres. Similarly, while radioiodine uptake studies are probably more accurate than any method, the necessary equipment is very delicate, expensive and requires expert physicists for its operation.

TREATMENT

Medical

Continued treatment with iodine gives temporary relief of symptoms. It is, however, contraindicated for eventually it results in iodine hyperthyroidism.

X-ray therapy, even with adequate dosage gives poor results.

Radioactive iodine therapy is still in the experimental stage. It may be indicated in some difficult cases but there is much difference of opinion on this point. If used, great caution must be exercised. Small frequent doses are safest and the therapeutic dose is arrived at after estimating the uptake of a test dose. This caution is occasioned in part by fear of later complications such as myxedema; malignant change; a long range effect on the ovary resulting in mutations; and cicatrization from the thyroiditis induced by this agent with involvement of the recurrent laryngeal nerves.

Thiouracil and its derivatives may be used as follows:

(a) Preoperative preparation.
(b) Long range therapy with hope of return to normal function.
(c) Life-long treatment.

Regarding (b) and (c) there is much variation of opinion regarding their efficacy. The therapeutic procedure is to administer methyl or propylthiouracil in sufficient dosage to bring the hyperthy-

roidism down to normal after which a controlling maintenance dose is given for 9 to 18 months (depending on the treatment centre) and then withdrawn with the hope that a relapse will not occur. If relapse occurs the course may be repeated with the hope of the patient remaining normal on withdrawal or with the intention of controlling the disease for the rest of the patient's life.

Certain precautions are deemed necessary during therapy with thiouracil derivatives because of their potential toxicity (dermatitis, gastrointestinal symptoms, fever, lymphadenopathy and rarely agranuocytosis). The patient must be followed regularly in clinic or by his physician and a white blood count done every two or three weeks. However, agranulocytosis, if it is going to occur, comes like a bolt from the blue and the patient must be vigorously instructed to stop treatment at once if he becomes feverish, has gastrointestinal symptoms, develops dermatitis or a sore throat. In addition he must take no sulfa drugs and must report to his physician or clinic at once.

In general the results of therapy with thiouracil derivatives alone with hope of eventual return to normal, are as follows:

(a) In juvenile hyperthyroidism (occurring just after puberty), gives 60 per cent or better good results. This is fortunate, for surgery in this group gives poor results and the disease was formerly incureable in the majority of cases.

(b) In early diffuse toxic goitre, gives 50 per cent good results.

(c) In old long standing cases of hyperthyroidism, gives less than 30 per cent good results.

Surgical

PREOPERATIVE PREPARATION

The thiouracil derivatives are well established as the preoperative preparation of choice. Methyl thiouracil is preferable to propylthiouracil because it is practically as effective as thiouracil and only slightly more toxic than the propyl derivative.

Iodine preparation has become obsolete because:

(a) It does not bring the B.M.R. down as well and indeed may be ineffective.

(b) The patient must be operated on as soon as the B.M.R. is normal.

(c) There is much greater danger of postoperative thyroid storm.

As thiouracil derivatives exert their effect by preventing the synthesis of thyroxin, the hyperthyroidism continues until the thyroxin already stored in the gland is depleted. This makes preparation with thiouracil derivatives a slower procedure than preparation with iodine. The length of time also shows greater individual variation. This delay, however, is advantageous for it permits more time to treat concurrent conditions such as cardiac disturbances and malnutrition. Other important advantages are that it is not necessary to operate as soon as the hyperthyroidism is controlled; a convenient time can be chosen for operation and the patient can usually continue to work until the lask week of preparation.

As thiouracil derivatives do not inhibit T.S.H. the thyroid gland continues to be hyperplastic, friable, highly vascular and therefore difficult to operate upon. Consequently iodine, which renders the gland firm, less friable and less vascular is administered during the last ten days to two weeks of preparation.

The following criteria serve to indicate that the patient is prepared for operation.

1. A resting pulse of less than 100 per minute.
2. A B.M.R. that is neither above or below normal limits.
3. (Probably the most important single criterion for control of toxicity): a significant steady gain in weight.

SURGERY

In general it may be stated that subtotal thyroidectomy still gives the surest results in the shortest time to the greatest number of patients. It gives 80 per cent good results; an additional 10 per cent become myxedematous (easily controlled with thyroid therapy) and 10 per cent are still toxic and require additional treatment (surgery, radioactive iodine or thiouracil compounds).

The operation is not without risk. While Lahey reports a mortality rate in 2100 cases of 0.21 per cent and Poate reports not a single mortality in 500 cases, in smaller centres these figures would require an upward adjustment to about 1 per cent.

In addition there are certain complications that may occur, the commonest being injury to the recurrent laryngeal nerve and bleeding. Parathyroid insufficiency is fortunately rare. These and other complications can be largely avoided if the following general operative principles are observed.

1. Removal of sufficient gland (70-90 per cent in most cases).
2. Preservation of thyroid tissue sufficient to maintain adequate function (1/6 to 1/3 of a lobe).
3. Meticulous control of bleeding.
4. Avoidance of sepsis and injury to adjacent tissue.
5. Preservation of the posterior-mesial aspect of the lobe and thus provide a protective barrier for the recurrent laryngeal nerve.
6. Attainment of a satisfactory cosmetic result.

POSTOPERATIVE COMPLICATIONS

Postoperative hemorrhage occurs readily because of the gland's rich blood supply and the attachment of the remnant to the constantly moving trachea. Because the patient may suffocate and have his cardiac action impaired because of pressure on neck structures, this is a very serious complication. Swelling of the neck, respiratory distress, guttural voice changes, or cyanosis may announce the onset of hemorrhage which commonly occurs about 12 hours postoperatively but may occur up to 24 hours. The patient is rushed at once to the operating room, the wound opened, the clot removed and the bleeder tied off.

Respiratory stridor not uncommonly occurs as a complication and may be due to hemorrhage, tetany, collapse of the trachea or edema of the glottis. However, most commonly it results from paralysis of one or both vocal cords incidental to operative trauma to the recurrent laryngeal nerve. Unilateral nerve injury causes no trouble unless there is marked edema of the glottis. On the other hand bilateral injury causes severe stridor and usually requires tracheotomy. Edema of the nerves may produce a vocal cord paresis with onset one to two days postoperatively and persisting two to five days before passing away completely. Depending on the severity of the stridor, administration of oxygen and/or tracheotomy may be required at once.

Parathyroid insufficiency, though rare, must be constantly kept in mind for in its early stages it may easily go unrecognized. Its onset is suggested by numbness of the face and hands, difficulty in focusing the eyes, general weakness or mild respiratory stridor. Chvostek's sign and Trousseau's sign may also be elicited. Immediate treatment consists of calcium lactate orally or intravenous calcium gluconate in severe cases.

Finally, for good results in any treatment of hyperthyroidism it must be borne in mind that this is a composite ailment effecting all tissues. Supportive therapy is of the utmost importance. In addition to correcting any noxious psychology in the patient's environment, reassurance and sympathy from the attending physician are constant requirements.

SUMMARY

The salient features of the anatomy, physiology, etiology, clinical considerations and treatment of hyperthyroidism have been briefly reviewed. The general effects of the disease on all body tissue has been indicated as well as the consequent necessity of early diagnosis and vigorous adequate treatment if satisfactory long-range results are to be attained.

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THE HEALING ART IN ANCIENT ERIE

For falling sickness: put salt and wite snails into a vessel for three days, add seven woodbine leaves; mix to a paste and poultice for nine days. A plaster of mandragore and ground-ivy placed on the head and if the patient sleeps, will do well, if not he will not.

For dysentry: woodbine and maidenhair should be boiled in new milk with oatmeal and taken three times a day.

For the liver: leaves of plantain, wild sage, shamrock, dockleaf, and the flower of the daisy, plucked by the person before sunrise and fasting on Monday and Wednesday, while saying a "Hail Mary" and a "Paternoster".

From *Magic and Healing*

ITCHING

J. B. REDFORD, B.A., 5T3

PHYSIOLOGY

Itching is a common symptom which may cause a patient considerable discomfort but which may be ignored by the physician. It may be defined as "an unpleasant cutaneous sensation which provokes a desire to scratch." This may be felt over the whole body surface, there being increased responsiveness around the anus, the external auditory canal, and the nostrils. It is impossible to elicit it from denuded areas of skin as it arises exclusively in the epidermis.

It is related to cutaneous pain; from an area where pain is lost but touch is intact no itching can be elicited. Superficial tickling progresses to itching, and itching to diffuse burning pain when the intensity of the stimulus is gradually increased. The sensation apparently originates in the free nerve endings of richly ramifying axons in the epidermis. It can be evoked by chemical, mechanical, thermal and electrical stimuli acting from the outside as well as from the inside.

If there is slight damage to a local area of skin leading to an inflammatory lesion, even though the spontaneous itching of the lesion itself lasts for only a few minutes, an area of increased irritability persists for many hours around the area of the lesion. Thus normally inadequate stimuli such as light touch, pressure, and temperature changes will produce intense itching sensations. This explains why the site of a mosquito bite will start to itch again if it is slightly rubbed long after it is forgotten. There is no itching skin disease in which this does not occur.

Experiments have shown that nerve endings mediating the itching sensation are made more sensitive by increasing capillary dilatation. Thus heat and tissue anoxia increase the symptom, while cold and adrenalin tend to diminish it.

The "triple response" which occurs in the skin due to the release of H-substance is always accompanied by itching. Histamine introduced into the skin produced the sensation in its purest form. Lewis and his associates have postulated that H-substance may be its chemical mediator. Hypersensitivity skin reactions are always accompanied by itching which may occur even before the lesions become evident. In such cases and in the "triple response" phenomenon a histamine-like substance may be the cause. However, in the absence of gross or microscopic changes as, for example, in the pruritis accompanying pregnancy, diabetes, hepatic disease, and lymphoblastomas, this theory cannot be accepted.

Itching may be excited centrally as well as peripherally. There is an integrating centre for its perception in the hypothalamus. Morphine may sometimes cause itching, probably by acting on this centre. Itching is observed in some diseases of the central nervous system, for example, in tabes and in general paresis; occasionally it is seen in idiocy, epilepsy, and manic-depressive psychosis. Senile cerebral arteriosclerosis is often associated with an intense itching called senile pruritis. This may be

aggravated by the senile changes in the skin.

The motor response to itching of scratching, rubbing, and kneading the skin is controlled to a certain degree by will power and consciousness. Scratching will stop itching only if the itching is caused by a foreign body which it removes or if it tears off the epidermis in its entire thickness. In all other cases scratching is useless. In fact it often sets up a vicious circle: as soon as it ceases an increased itching ensues as an after-sensation; then increasingly violent scratching produces increasingly violent itching, and this tormenting scratching-itching paroxysm may only cease with mental and physical exhaustion of the patient.

ITCHING AS A SYMPTOM

Itching may be generalized or localized. The three chief areas involved in localized itching are the scalp and the anal and genital regions. Generalized itching occurs in many cutaneous disorders, but also may be a sign of some serious systemic disease. The term "pruritis" should be confined to those cases in which no cutaneous lesions have preceded the itching. This article is chiefly concerned with generalized pruritis.

Itching is of little diagnostic value if it is of short duration, as most cutaneous lesions will itch as a result of increased local excitability. In the analysis of the symptom it is not enough to simply ask if the patient complains of itching; the examiner should ask:

1. Is your sleep disturbed by the itching?
2. Can you forget about the itching if not paying atention to it?
3. Can you stop your compulsion to scratch with little difficulty?
4. Does itching occur only in a warm environment, in cold weather, when you rub the spot, or undress, etc.?

On the basis of these questions Rothman and Shapiro have defined an itching condition as "obligate itching" if it disturbs the patient's sleep and as "facultative itching" and of less diagnostic importance if it does not.

Obligate itching conditions include:

1. Scabies, pediculosis, insect bites and other external conditions producing urticarial wheals.
2. Contact dermatitis.
3. Urticarial and toxic eruptions.
4. Pruritis due to pregnancy, hepatic disease, lymphoblastomas, internal malignant neoplasms, and renal insufficiency.
5. Other cutaneous disorders such as neurodermatitis, prurigo, dermatitis herpetiformis, lichen planus.

Facultative itching conditions include:

1. Asteatosis.
2. Pruritis due to diabetes.
3. Skin infections.
4. Local anoxia due to varicose veins, tight clothing, etc.
5. Other cutaneous disorders such as psoriasis, pityriasis rosea, seborrheic dermatitis.

PHYSICAL EXAMINATION

Careful physical examination is, of course, necessary in any patient who complains of itching. Evidence to evaluate the patient's statements will be the scratch marks that are often present. However, in a great many conditions these will not be found. The patient may have a high threshold for the scratch response or may rub, press, or pinch the area instead of scratching. Scratch marks are not generally found in urticarial

eruptions, neurodermatitis, and in lichen planus. Highly polished nails may indicate that the patient is scratching and rubbing the itching area.

If scratch marks and excoriations are present their nature and location may assist in the final diagnosis. Long linear scratch marks are mostly seen in pediculosis, scabies, lymphoblastomas, malignant tumors, liver disease, renal insufficiency, and pruritis of pregnancy. In scabies the itching papules are torn off as they are formed, leaving a bloody crust. With the neurotic excoriations found in psychoneurotics with an uncontrollable desire to dig and pick at the skin, the torn off skin surface leaves pitting scars. The scabs may fall off and leave pigmented spots, particularly over the back, the face, and other easily accessible regions. Scratch marks located around the back of the neck may be the only indication of head lice infestation: scratch marks located around the hands and wrists, in the axillae, or in the genital regions in the absence of burrows may be the only indication of scabies.

Pyogenic infections—pustules, impetigo, boils, cellulitis, etc.—often develop secondarily to scratch excoriations. In the pruritis due to diabetes, staphylococcal infections of the hair follicles are particularly common.

Following scratching sometimes there is a gradual enlargement of the subcutaneous lymph nodes. This may develop in the absence of a clinically evident pyogenic infection, and thus may lead to an erroneous diagnosis of lymphoblastoma on purely clinical grounds. Lichenification, the formation of leathery raised shiny fields between deepened skin lines, is another common consequence of scratching. It is characteristically seen in neurodermatitis, but may also be present in chronic allergic eczema and in lymphoblastomas.

GENERALIZED PRURITIS

If the body is examined carefully and no cutaneous lesion producing the itching can be found, some other cause must be sought. However, the cutaneous change producing the itching may be slight as, for example, in asteatosis. This is the scientific term for "dry skin"—a lack of the normal greasy cover to the skin that is supplied by the sebaceous glands. It is commoner in the winter for the amount of oily secretion falls markedly as the atmospheric temperature is lowered. Decrease in sebaceous gland activity causes increased itching susceptibility, and the patient complains of generalized itching particularly when there is a fall in external temperature, as when he is undressing. The characteristic sign is a dry rough skin that may show fine pink lines and adhering scales. A similar skin condition is often noticed in early hypothyroidism although itching is not typical of myxedema.

Diabetes, particularly in the milder forms, may be associated with a severe pruritis. The cause is unknown; experiments have shown that it is not related to high glucose concentration in the skin or to acidosis. However, there is no doubt that diabetes causes the itching, for under adequate diabetic therapy the complaint disappears promptly. A factor complicating the picture in diabetes is the development of asteatosis, the degree of which varies in different individuals and under different circumstances. Therefore, a patient who complains of generalized pruritis and presents signs of asteatosis associated with signs of pyogenic skin infections from scratching should be suspected of having diabetes.

Local anoxia as a result of venous stasis produces a facultative itching condition that is most common in the lower limbs. It is typically associated with varicose veins, and is promptly relieved by correction of the venous stasis. The itching is not associated with inflammation but simply with slowed circulation in the skin.

Pregnant women sometimes suffer from an intense generalized pruritis during the last month of pregnancy. This is an obligate itching disorder that commences rather suddenly and disappears within the first few days after delivery. The resulting excoriations with pustules and pigmentation look rather like scabies, and an erroneous diagnosis is sometimes made. The cause of this itching is obscure. It may result from nervous instability which in some persons is more pronounced at this time. However, more probably it is caused by metabolic products from the fetus that are foreign to the mother since it disappears so promptly after delivery. Sometimes there is an itching skin eruption with a similar course and probably with a similar cause to the pure pruritis of pregnancy. A generalized pruritis is also sometimes seen in a less severe form during menstruation.

In about twenty per cent of cases of obstructive jaundice there is an associated itching. Clinical studies have shown that the degree of pruritis is not associated with the depth of the skin discoloration. Indeed, the itching may be present before or after the clinical appearance of jaundice and may come and go while the jaundice persists. Although bile acids and bile salts have been blamed for the itching, experimental proof is lacking. There may be chemical changes stimulating the nerve endings directly, or these chemical changes may even affect the itching centre in the hypothalamus. Whatever the mechanism, there is no doubt that disturbed liver function causes generalized pruritis since it occurs in liver disease unaccompanied by icterus and disappears when the disease is successfully treated.

An exasperating generalized pruritis is often associated with the lymphoblastomas. Often this is the first symptom of Hodgkin's disease and mycosis fungoides. Occasionally it precedes the visible lesions of lymphosarcoma and lymphatic leukemia, but it is extremely rare in myelogenous leukemia.

Quite rarely malignant tumors, especially those originating in the abdominal organs, may give rise to generalized itching. Presumably toxic substances are formed from the tumor cells and carried in the blood stream to affect the skin secondarily. True metastases to the skin do not itch, with the exception of the cutaneous manifestations of Hodgkin's disease.

Kidney disease with retention of nitrogenous substances is associated with itching. Possibly the itching in such cases is caused by uric acid retention in the skin, for a generalized pruritis is also sometimes associated with gout.

Among medicaments that may cause generalized pruritis are adalin, alcohol, arsenicals, cannabis, cincophen, cocaine, gold salts and opium derivatives.

A great many patients complain of a generalized pruritis that has no organic basis. Care must be taken, however, not to make a diagnosis of "nervous itching" until all organic causes have been excluded, especially if the itching lasts for more than a few days. Persons developing a psychogenic pruritis are generally of the unstable self-driving type who are

prone to develop other neurodermatoses, such as neurodermatitis, urticaria, and dyshidrosis. In pruritis ani and pruritis vulvae the psychogenic factors are much commoner than in generalized pruritis. Such patients very easily become victims of the vicious itching-scratching cycle.

Diagnostic aids for the differential diagnosis of generalized pruritis include:

1. Urinalysis—diabetes, nephritis, hepatic disease.
2. Blood work—white blood cell dyscrasias (white blood count is normal throughout mycosis fungoides).
3. Chest X-ray—Hodgkin's disease, lymphosarcoma.
4. Biopsy of lymph node—lymphoblastomas, malignant neoplasms.
5. Hepatic function tests—liver disease.

THERAPY

Treatment of generalized pruritis must, of course, first of all be directed to treatment of the underlying cause if it can be determined. Relief or arrest of any underlying disease plus local symptomatic treatment will usually relieve the pruritis. All medication should be stopped if medicaments are suspected as a cause. In the pruritis of pregnancy and that associated with liver disease, dramatic relief is often obtained in using generalized ultraviolet radiation in suberythematous doses. Soft X-ray radiations in small doses are sometimes used in intractable localized pruritis. Sedation may help relieve the pruritis if the underlying organic disease is not amenable to treatment.

Senile pruritis can be controlled by intravenous injection of sodium bromide. This is given three times a week using a ten per cent solution, starting with a twenty millilitre dose and gradually increasing the dose until fifty millilitres is reached.

Asteatosis may be readily relieved by simple therapeutic procedures: restrictions in the use of soap and water; massage of a lubricant, such as anhydrous lanolin or ointment base into the skin.

There are innumerable antipruritic preparations for local application none of which are very effective. These include calamine liniment and various combinations of menthol, camphor, phenol, and benzocaine.

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A philosophy of life helps us to bear with equanimity the misfortunes of our neighbours.

JONATHAN SWIFT

SOME COMMENTS ON MENTAL HYGIENE

MISS S. M. BAKER, 5T2

MENTAL HEALTH is the "harmonious development of the mind in relation to its environment". What does this mean?

The mind is a complex place as is the environment, and bears in it elements of reason, emotion, and moral obligation. The well balanced man has a good tempering of these opposing elements. In the poorly balanced man, one or more of these elements has an over-prominent place, and tends to crowd the other out of existence. The unbalanced man runs to excesses of vice or virtue; the well balanced to temperance in all things. He adheres to the old Greek maxim of "Nothing in Excess."

The environment is a not less complex subject. Throughout a lifetime it presents many situations and opportunities. Happy is he who can exercise such a critical faculty that he selects those experiences of benefit to him, and profits by those he has not selected, but which have nonetheless occurred.

It is evident that a person such as has been described is he who has learned to rely on his own judgment—he who attempts to weigh opposing factors in a conflict and choose a course. He fully accepts the consequences of such a course.

This is "harmonious development of the mind in relation to its environment". It is harmonious because of its lack of discord. There cannot well be discord where a man accepts fully the responsibilities of his actions.

Conversely, there is disharmony if he does not. Such a man follows a pathway much at random, according to the whim of the moment. He then feels cheated if it turns out not to his benefit. He seeks for excuses, and puts the blame for failure in any place other than the rightful one—his own shoulders.

The foregoing discussion is general. The harmonious mind has been idealized to a degree to which it probably does not reach.

Practically, such an ideal is approximated more easily by some than others. Intellectually at least, it is not true that "All men were born equal". No more is it true of the environment to which they become exposed. For each man seems to arise those difficulties with which he is least well equipped to deal. Each feels he has to deal with "slings and arrows of outrageous fortune". So often it does not seem to occur to him that it is because of his own personality that difficulties arise.

The clue to a harmonious development is an honest search for understanding—of oneself, one's fellows, and one's environment. More to be desired than gold or precious stones is the sense of perspective, the evaluation of one's abilities, emotions, and environment, so that ultimately one may face the 'opposing numbers' so that it may not 'pluck their hearts from them'.

SPONTANEOUS ABORTION

ANNJANE CARTER, 5T2
NOREEN CROCKER, 5T2

DEFINITION

Spontaneous abortion is the termination of a pregnancy before the twelfth week through natural causes, without the aid of mechanical or medicinal agents.

INCIDENCE

Spontaneous abortion occurs in about 10 per cent of all pregnancies. Neither race, social status or parity seems to effect this incidence.

ETIOLOGY

According to the investigation of Hertig and Rock, approximately 70 per cent of spontaneous abortions can be attributed to defects of the ovum, and 30 per cent to maternal causes.

Defects of the ovum

Defective germ plasm accounts for the majority of abnormal ova. This can be produced by either (i) abnormal chromosomes and genes or (ii) faulty uterine environment. These cannot be demonstrated in the human, but have been observed in insect and animal experiments.

Maternal causes

ENDOCRINE DYSCRASIAS

Progesterone is secreted by the normal corpus luteum and is estimated clinically by pregnanediol in the urine. The trophoblast secretes chorionic gonadotrophin which stimulates the corpus luteum until the trophoblast itself produces progesterone or progesterone-like substance. Therefore, it can be presumed that if the trophoblast is at fault the amount of pregnanediol is normal and the amount of gonadotrophin is low. If during the early months of pregnancy the pregnanediol (progesterone) is defective in quality or quantity the preparation of endometrial surface is not adequate for the development of a normal trophoblast. The interrelationship between the endocrine glands of the human body makes the possibility of dysfunction great. Myxedematous symptoms and a low B.M.R. have been found in studied cases of abortion. Numerous theories have been presented and vast numbers of experiments observed, but very few facts proven.

SEVERE ACUTE INFECTIONS

The fetus may be affected by specific organisms or toxins passed from the maternal circulation. The chief organisms responsible are the viruses and pneumococci.

CHRONIC WASTING DISEASE

Occasionally tuberculosis or carcinomatosis causes abortion.

ABNORMALITIES OF THE REPRODUCTIVE ORGANS

1. Cervical tears that heal with poor apposition.
2. Congenital short cervix or one shortened by surgery.
3. Submucous fibroids or those situated in the lower uterine segment.

OTHERS

Laparotomy, psychic and physical trauma have all been cited as etiological

agents, but a sufficient number of cases have not been studied to rule out coincidence. Vitamin C and vitamin K have been considered as causes of abnormal vessels with subsequent bleeding within the placenta resulting in an abortion.

PATHOLOGY

Hemorrhage occurs at the placental site into the decidua basalis. The ovum becomes detached and acts as a foreign body initiating uterine contraction in an attempt at expulsion. In the gross specimen the membranes are opaque, thick, and distended. Microscopically the villi show hydatid degenration. Before the tenth week the ovum may be expelled as an intact sac, but between the tenth and sixteenth week, the chorionic elements are retained within the uterus. Atypical forms frequently seen are (i) Hydropsical ovum—a small hydramniotic sac in which the fetus is completely absent or is a small amorphous mass. (ii) Carneous mole—an ovum surrounded by a capsule of clotted blood containing degenerated chorionic villi. (iii) Tuberous mole—a nodular specimen resulting from localized hematomas between amniotic and chorionic membranes. (iv) Fetus compressus—amniotic fluid is absorbed and the fetus is dessicated.

CLASSIFICATION

Any spontaneous abortion can be

(a) *Complete*—where the entire products of conception have been expelled.

(b) *Incomplete*—when part, usually the placenta, remains in the uterus.

The majority of spontaneous abortions are incomplete. The post-abortive course may be *aseptic* or "*septic*". The part of the decidua retained in the uterus may cause an elevation of temperature over 100°, increased W.B.C. and increased sedimentation rate although the culture is negative. Any *true septic* abortion with elevation of temperature and presence of pathogenic organisms (hemolytic strep, B. welchii, etc.) on culture is not considered spontaneous, but induced. There is a possibility that an incomplete abortion with bleeding for some time may become secondarily infected—but this forms only a small percentage.

CLINICAL ASPECTS

Threatened abortion

An abortion is threatened when any bloody vaginal discharge occurs during the first sixteen weeks of pregnancy. Colour varies from bright red to dirty dark brown—intensity depending upon the amount of accompanying mucus. The amount varies from slight spotting to frank bleeding, and may or may not be accompanied by pain. If present, pain is anterior and clearly rhythmic in type simulating labour, or persistent low backache associated with pelvic pressure, or a dull suprapubic discomfort with urinary frequency and tenderness over the uterus. When the bleeding persists or becomes copious with passage of large clots, and simultaneously there is a severe cramp-like abdominal pain the prognosis for the pregnancy to continue to term is decreased.

The most important aspect of treatment is bed rest, continued until 3-7 days after bleeding has ceased. Light diet and regulation of bowels with mineral oil, and no enema or strong laxative is recommended. Codeine or morphine are administered for pain if necessary. Bar-

biturates are used to sedate the apprehensive patient. Complete explanation of the etiology and clinical prognosis of spontaneous abortion should be given to the individual patient. When the bleeding stops, activity should be gradually resumed, the patient keeping in touch with her physician. Intercourse should be avoided until after the fourth month of the pregnancy

Inevitable abortion

An abortion becomes inevitable when the cervix begins to dilate. Bleeding although rarely fatal may be extensive and produce shock. Increased susceptibility to infection raises the mortality rate. When symptoms of threatened abortion become severe or prolonged, hospitalization is recommended and vaginal examination should be performed with sterile technique to determine the state of the cervix. Blood is crossed and typed on admission for possible transfusion. As soon as a diagnosis of inevitable abortion is positive a dilatation and curettage is carried out. If the patient is febrile, conservative treatment with bed rest and antibiotics should be used continuing until smears and cultures are reported negative for pathogenic organisms and the temperature has returned to normal —then a dilatation and curettage is performed. However, if a septic abortion is hemorrhaging excessively a dilatation and curettage is done at once covered by suitable chemotherapy.

Missed abortion

When an intrauterine pregnancy is retained in the uterus after its death it is termed a missed abortion. The first few weeks of these pregnancies are completely normal, the ovum then dying. At this time there may be bleeding suggesting a threatened abortion, or no symptoms. The uterus seems to remain stationary in size and the breasts regress, although amenorrhea persists. In six to eight weeks careful palpation indicates the uterus growing smaller. The Aschheim-Zondek test becomes negative in normal dilutions (4 weeks) but never completely negative as long as chorionic elements are present within the uterus. Usually after the second month the abortion completes spontaneously. In some centres once the positive diagnosis of missed abortion is made a dilatation and curettage is performed. Others feel it is safer to allow nature to complete the abortion because of the likelihood of uterine perforation.

Habitual abortion

The exact number of consecutive abortions necessary to be called habitual is of some doubt. Even after two subsequent spontaneous abortions a third gestation has a 63 per cent chance of success. After three subsequent spontaneous abortions the prognosis drops below 20 per cent. Most authors consider habitual abortion as a condition where a woman has three or more spontaneous consecutive abortions.

There should be a preliminary investigation before another pregnancy is undertaken. The prospective mother should have a complete physical and pelvic examination. Local conditions of the reproductive tract should be treated at once. General health should be improved —foci of infection removed, anemia corrected and diet directed toward an optimal weight. Immoderation in smoking, drinking and activity should be avoided. A complete physical examination of the husband is included emphasizing microscopic smears of the semen. He should

follow a similar hygienic regime if any abnormality is detected. Intercourse should be avoided during the first four months of gestation.

SPECIAL THERAPY

1. *Thyroid extract*—Treatment is considered if the B.M.R. is low. Dosage of ½-2 grains daily begins 3 to 4 months before pregnancy and is maintained throughout.

2. *Progesterone and estrogen*—Pregnancies with poor formation of hormones have been treated with replacement therapy. At present its evaluation is not determined; however, centres with a steroid laboratory for determination of maternal hormones have replaced specific deficiencies and claim success.

3. *Vitamins*—Vitamin E deficiency occurs in only a few cases of habitual abortion, and its significance is unknown. Recent studies of the biochemical activity of vitamin E indicate that it may act with progesterone and estrogen in the uterine muscle. Most centres use 25 mgm of alpha-tocopherol daily as an empirical treatment of habitual abortions. Vitamins C and K can be given as prophylaxis against defective vessel walls and disturbances of the clotting mechanism.

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For the crass therapeutic credulity so widespread today, and upon which our manufacturing chemists wax fat, there is no more potent antidote than the healthy scepticism bred of long hours in the post-mortem room.

W. Osler

ERYTHROCYTE SEDIMENTATION RATE

R. F. PROUD, 5T3

INTRODUCTION

As the exact significance of the erythrocyte sedimentation rate is not completely understood, and, as it is a test which enjoys wide clinical use, this paper is an attempt to briefly review the literature both past and present in order to reach a clearer understanding of its implications. The erythrocyte sedimentation rate or, the rate at which the red blood cells settle out of citrated blood, varies in disease and under certain conditions of health.

HISTORICAL

According to the pathology of antiquity as expounded by Hippocrates and Galen, health was conceived as dependent upon the normal mixture of four fluids in the vascular system—cholera, the serum; melancholia, the dark lower part of the blood clot; sanguis, the bright red part of the blood clot and phlegma, now known as fibrin. These Hellenic authorities believed that the accumulation of phlegma was by far the most important cause of nearly all diseases. In modern times the four fluid theory of antiquity has fallen into disrepute but the "buffy coat" or fibrinous layer which appears in blood drawn from sick persons has not diminished in importance.

The cellular concept of pathology expounded by Virchow replaced the humoral theory of the cause of disease and this advance coincided with the observations of Sydenham, Hunter and Hewson that drawn blood had an unusual appearance in disease. During the nineteenth century exhaustive studies were made of sedimentation velocity and aggregation of red blood corpuscles by Nasse (1836), Denis (1838) and Jones (1843). Andral and Gavarret did the first quantitative analysis of blood one hundred years ago. They found that fibrin was several times increased in blood from sick persons but they did not associate this fact with the increased aggregation of red blood corpuscles. Muller in 1833 examined the causes of the fibrinous "buffy" which appeared on the surface of blood taken from sick persons and attributed the increased sinking velocity of red blood cells to the increased amount of fibrin in the blood of these patients.

Robin Fahraeus, a Swedish scientist, first applied the settling velocity of red blood cells as a clinical test for pregnancy in 1918. Later that year he published his preliminary observations on theoretical factors influencing the stability of erythrocyte suspensions:

(1) *Specific Gravity:* Corpuscles of high specific gravity sink more rapidly in normal plasma than do normal red blood corpuscles; conversely, normal red blood cells settle more quickly in plasma of low specific gravity than in normal plasma.

(2) *Viscosity of Plasma:* Lowered viscosity of plasma causes an increase in the rate of erythrocyte sedimentation; the converse is also true.

(3) *Size of Corpuscles:* An increase in the size of corpuscles increases their mass disproportionately to their surface

area and consequently increases their rate of settling out.

(4) *Clumping of Corpuscles:* Aggregations of corpuscles act in the same way as does an increase in the size of corpuscles—the sedimentation rate is increased.

Fahraeus could not demonstrate in any of his experiments that factors 1 to 3 existed as such and he concluded that the "clumping" factor was the cause of the lowered stability of the erythrocyte suspensions.

METHODS OF DETERMINATION OF ERYTHROCYTE SEDIMENTATION RATE

(1) Westergren Method: Freshly drawn blood is diluted in the ratio of 4:1 with a 3 per cent solution of sodium citrate. This solution is then drawn into a vertical glass tube with a bore of 2.5 mm. to a height of 60 mm. The erythrocyte sedimentation rate is then measured as the distance in mm. that the upper level of red corpuscles falls in one hour.

(2) Linzenmeier Method: The time required for the upper level of the sedimenting corpuscles to fall a specified distance is measured.

(3) Rourke-Ernstene Method: The rate of sedimentation per minute is measured.

(4) Wintrobe Method: 5 cc. of venous blood is added to 4 mg. of solid potassium oxalate and 6 mg. solid ammonium oxalate. The hematocrit tube, held in the vertical position, is filled with oxalated blood to the 10 cm. mark and the upper level of the sedimentation corpuscles is read at intervals or at the end of one hour. The blood must be at 22 to 27 degrees centigrade during the test. The sedimentation rate thus obtained is corrected for alterations due to anemia by a graph which charts sedimentation rate in mm. per hour against packed volume of red blood cells per 100 c.c. of blood.

Cutler demonstrated that the process of sedimentation consists of three phases:

(1) A preliminary period during which aggregation of red blood cells takes place.

(2) A period of rapid fall.

(3) The phase of packing when the corpuscular masses, in accumulating at the bottom of the tube, slow up the rate of sedimentation. If a record of the erythrocyte sedimentation rate is made at frequent intervals, it is possible to measure the phase of rapid sedimentation which is the significant phase. When readings are made only at the end of one hour, the figure obtained is influenced by packing of the corpuscles.

It has been found that there is a closer correlation between the sedimentation index of Rourke and Ernstene and plasma fibrinogen concentration than between the quantity of fibrinogen and sedimentation rate as measured by any other method. Its chief drawback is that it is too time-consuming for routine work.

MECHANISM OF SEDIMENTATION OF ERYTHROCYTES

Settling occurs because the density of the red corpuscles is greater than that of the medium. The fall of red corpuscles causes an upward displacement of the medium, thus producing an upward current and a retarding force. In blood drawn from normal persons, the concentration of red blood cells is relatively

great and a relatively large volume of plasma must be displaced upwards if much sedimentation is to occur. Actually the downward and upward forces in normal blood are nearly equal and consequently little settling occurs.

When the number of red blood cells is less than normal, there is less retardation of sedimentation by the red blood cells themselves. No matter how high the column of blood may be, retardation is produced by the cells striking the bottom and piling up on one another. It is obvious that the fewer the cells, the less this retarding effect will be. Wintrobe has devised a scale for correcting for decreased retardation of sedimenting red blood cells in anemia.

The above statements refer to a vertical column of blood. Any deviation from the vertical causes an acceleration in sedimentation rate. This is due to the fact that the plasma streams along the upper side of the tube from which the red corpuscles have already settled out and the latter therefore encounter less hindrance from displacement of the medium.

The factor which is of chief importance in affecting the sedimentation rate in disease is the size of the sedimenting particle. The larger the volume of the particle, the smaller is the relative surface. The upward or retarding force is a function of the surface area exposed to the medium. The downward force depends on the weight of the particle. While increases above normal in the volume of the individual red blood cells tend to accelerate their sedimentation rate, such differences as may be encountered have a comparatively slight effect on sedimentation rate. In certain conditions the aggregation of red blood cells is greatly affected, probably because of an alteration in their surface charges. Rouleaux formation results in production of corpuscular aggregates of large volume but of relatively small surface area. An acceleration of the sedimentation rate results—as seen in the presence of disease and pregnancy. The cause of the increased aggregation is quite obscure. It can only be postulated that variations in sedimentation rate result from changes in the surface charges of the red blood cells which cause them to aggregate and these changes are related to alterations in plasma particularly in the physical state of plasma colloids.

Recent work suggests that the character of the plasma and not that of the red blood cells is the determining factor in the rate of erythrocyte sedimentation. If cells from blood with a high sedimentation rate (e.g. 35 mm. per hour as seen during pregnancy) are suspended in the plasma of blood having a low sedimentation rate (e.g. 0.5 mm. per hour, as seen in the newborn) they settle out at the slower rate.

In the past forty years a great deal of research has been done on the relationship between erythrocyte sedimentation rate and the levels of various constituents of plasma found in disease processes, but for the purpose of this discussion only those conclusions which have found some measure of acceptance will be discussed.

(1) Plasma Fibrinogen: Ham and Curtis (1938) studied 17 cases with an elevated erythrocyte sedimentation rate which showed marked elevation of fibrinogen but normal serum globulin levels and normal erythrocyte mean corpuscular volume. These patients suffered from acute and chronic infections, bleeding peptic ulcer, intravenous injection of typhoid vaccine and anemia from hemorrhage and nephritis.

Dr. A. A. Fletcher and co-workers in Toronto studied a series of 100 patients with rheumatoid arthritis and showed that a close relationship exists between the plasma fibrinogen level and the erythrocyte sedimentation rate. A plasma fibrinogen level of 200 mg. per cent was associated with a normal erythrocyte sedimentation rate. The E.S.R., however, showed increasing elevation with higher fibrinogen levels until a fibrinogen level of 700 mg. per cent was reached. At this point the red cells seemed to have reached their maximum sedimentation rate.

Studies done by this same group on rheumatoid arthritis patients treated with ACTH and cortisone indicate that as the E.S.R. drops, there is a lowering of the plasma fibrinogen levels and a coincident improvement in the clinical state. This parallel decline seems to hold whether induced by ACTH or cortisone, orally or by injection. The drop in plasma fibrinogen seems to precede the decrease in the E.S.R. by about 24 hours and on withdrawal of these hormones, the fibrinogen level begins to increase about 24 hours before the rise in sedimentation rate and the return of clinical symptoms. The phenomenon of the lagging E.S.R. may be explained on the basis of a coating of the red blood cells by fibrinogen which increases their agglutinability.

Some support has been given to this explanation by recent work done by electron microscopy at Western Reserve University by Block and Powell. They observed an irregular coating covering the entire cell surface of red blood cells taken from persons with clinical disease. They also observed bridges of this same material between cells which had aggregated or formed clumps. It appears likely that such evidence will be substantiated by further investigation.

Although changes in the other plasma proteins occur during ACTH and cortisone therapy, the changes are very much slower than that of fibrinogen and may take many months to return to their pre-therapy levels.

While discussing hormonal effects on E.S.R., it is interesting to note the results of heparin and dicumarol anticoagulant therapy. In 1948 Cosgriff published the results of an exhaustive study on the effect of heparin and dicumarol anticoagulant therapy on E.S.R. He concluded that, in the dosage employed clinically, heparin and dicumarol do not significantly alter E.S.R. Thus the E.S.R. of a patient receiving anti-coagulant therapy can be considered as reliable a guide in the management of such an individual as in patients not receiving anticoagulant therapy.

(2) Serum Globulins: Ham and Curtis in 1938 reported a series of 13 cases having an elevated E.S.R. in which the patients suffered from cirrhosis of the liver, primary carcinoma of the liver, toxic hepatitis (arsphenamine), chronic gonococcal arthritis, congestive heart failure, pernicious anemia, aleukemic leukemia and multiple myelomata. The serum gloubulin level was elevated in all cases but the serum fibrinogen had variable levels. Although macrocytosis existed in some of the cases, it was obvious that the alterations of the E.S.R. were greater than could be explained on the basis of macrocytosis alone.

(3) Lipoid and Cholesterol: Investigations on patients with lipemia showed that no definite correlation existed between lipoid or cholesterol levels and the E.S.R.

(4) Colloidal State of the Plasma: Ropes and Rossmeisl in 1939

attempted to explain the inconsistencies which are sometimes seen when changes in the E.S.R. are explained by changes in the fibrinogen and globulin levels. They concluded: "variations in the sedimentation rate are due to variations in the colloidal state of the plasma with consequent changes in the electric charges on proteins and red blood cells. Variation in the concentration of fibrinogen, globulins and other constituents affect the sedimentation rate through their effect of the colloidal state of the plasma."

This explanation was originally offered by Fahraeus in 1929 when he concluded that the increase of the sedimentation rate in pregnancy and other conditions was due to lowering of the electric charge of the red cells.

The present concensus of opinion is that fibrinogen is the component of blood thus far demonstrated to exert the greatest accelerating effect on sedimentation rate; alpha, beta and gamma globulins appear to cause lesser increases in sedimentation rate, but in some diseases, the concentration of gamma globulins may be so great as to play the major role. The increase in concentration of fibrinogen and globulins represents the reaction of the liver to infection. The possibility that small amounts of highly viscous non-protein substances of large molecular size may be the predominating factor in some diseases has not been excluded.

It should be remembered that there are other phenomena which resemble sedimentation but which are not due to increased plasma fibrinogen concentration, e.g.

(1) "Sludging" of blood following shock, burns, etc.

(2) Agglutination of red cells due to antigen-antibody reaction.

Bigelow, Heimbecker and Harrison postulate five important causes for sludging associated with trauma:

(1) local reaction to injury, (2) embolic blockage, (3) hemoconcentration, (4) reduced hydrostatic pressure (shock) and (5) vasoconstriction. The agglutination of red blood cells is due to the union on the individual red blood cells of antigen and antibody in the presence of electrolytes.

ALTERATIONS IN THE ERYTHROCYTE SEDIMENTATION RATE

It is increased in:

(1) Septicemia
(2) Pulmonary tuberculosis
(3) Rheumatic fever and rheumatoid arthritis
(4) Anemia
(5) Malignant tumors if vascular or undergoing degeneration
(6) Inflammatory conditions of the female pelvic organs
(7) Pregnancy
(8) Myocardial infarction

CONCLUSIONS

Although the E.S.R. is a non-specific test, its determination is of value for the following reasons:

(1) It is a measure of the activity of the inflammatory process in rheumatic fever and rheumatoid arthritis. This is the most common use of the E.S.R.

(2) In tuberculous processes it gauges the degree of activity.

(3) It is an index of the extent and intensity of pyogenic infections.

(4) It has been found helpful in differentiating coronary thrombosis from angina pectoris, carcinoma of the stomach from benign ulcer, rheumatoid,

tuberculous or gonococcal arthritis from osteoarthritis, pelvic inflammatory disease from uncomplicated ovarian cyst or catarrhal appendicitis.

ACKNOWLEDGEMENT

I should like to thank Drs. A. A. Fletcher and A. G. Gornall for their interest, assistance and constructive criticism in the preparation of this paper.

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A MEDICAL CALENDAR FOR MARCH

3 March 1905: Fritz Schaudinn demonstrated the causative agent of syphilis, Treponema pallidum.

5 March 1830: Birth of Etienne Jules Marey, student of muscle and nerve physiology, and inventor of the sphygmograph.

9 March 1862: Birthday of Ferdinand Widal who developed the diagnostic test for Typhoid named after him.

10 March 1628: Birthday of Marcellus Malpighi, founder of Histology.

13 March 1911: Death of Henry Bowditch, American physiologist who demonstrated the behaviour of heart muscle and nerve.

14 March 1854: Birthday of Paul Ehrlich, discoverer of Salvarsan, the specific for syphilis.

15 March 1854: Birthday of Emil von Behring, winner of the 1901 Nobel prize for his great contributions in the study of immunity.

16 March 1651: Birthday of Hendrick Van Deventer, father of modern obstetrics.

22 March 1761: Death of Pierre Fauchard, founder of modern scientific dentistry.

22 March 1800: Charter presented to the Royal College of Surgeons by King George III.

24 March 1882: Robert Koch announced the results of his study on the etiology of tuberculosis.

27 March 1797: Robert James Graves' birthday. He described and studied the condition of exophthalmic goitre which bears his name.

27 March 1845: Birthday of Wilhelm Konrad Roentgen, discoverer of the X-Ray.

28 March 1741: Birthday of William Withering who studied the effect of digitalis on patients with dropsy.

30 March 1783: Death of William Hunter, great English anatomist and obstetrician.

J.E.A.

A PROBLEM IN DIAGNOSIS

P. S. ROSEN, B.A., 5T2

INTRODUCTION

One of the greatest problems that faces the medical student and the clinician is met with in determining whether a patient has a functional or an organic disease. In many cases the functional element is immediately obvious, while in others extensive investigation is required before any conclusion can be reached. The following case illustrates some of these difficulties.

PRESENTATION OF CASE

Mr. W. J. a 26 year old white male was referred to the Medical out-patient department of the Toronto General Hospital by his plant physician, for investigation of severe headache. On admission, October 18, 1951, he was complaining of recurrent headache with vomiting.

Fifteen years before admission this patient struck his head on a rock while diving and although he required several stitches to close the wound, he does not remember any loss of consciousness. He continued in good health until a year before admission. At that time he experienced a sharp stabbing pain which started in the left occiput, spreading only slightly to the right side. This pain reached an immediate peak, persisted for one or two minutes, and was then succeeded by a dull, pressing, weighty sensation which vanished in one hour, leaving the patient perfectly well. From this time he was troubled by a pressing sensation over the left occiput, which occurred at irregular intervals, lasted for a few minutes and then disappeared.

Six months prior to admission, he suffered an attack of left occipital pain which resembled the first attack in site, spread and duration and which also was succeeded by the sensation of weight. One week before he was seen in the out-patient he was again seized by the same pain, this time coming on in the morning while he was riding to work on the street-car. The pain was so severe this time that it was necessary for him to leave the car, and sit down in a nearby park. The severe pain lasted one hour, during which time he was confused; again it was succeeded by the heavy pressing feeling. He felt weak and returned to his home, and spent most of the afternoon lying in bed. The pressure sensation persisted throughout the day. At 7 p.m. after having eaten almost no supper, he began to vomit. He was referred to the emergency department of the Toronto General Hospital, where it was decided that he did not need immediate attention and was referred to the out-patient department for further investigation.

His past health had always been excellent except for a peculiar attack of "appendicitis" suffered in 1944, while he was with the R.C.A.F. This episode occurred when he returned to his station late after a leave, and was characterized by a feeling of malaise with some abdominal pain. During the past three years he has been tired. This tiredness manifests itself in the morning, by his being unable to get out of bed. Once out of bed, he is still tired during the entire day, and in the evening after supper. He is never interested in doing anything, and

is quite content to spend all of Sunday morning and most of the afternoon lying in bed. A detailed functional enquiry contributed no significant details apart from those related to the nervous system.

He was an only child until he was fourteen years of age, at which time a younger brother was born. He did not resent the new child, although he was aware that his parents paid less attention to him than formerly. He was a good student, active in sports and had many friends. He entered the R.C.A.F. immediately after matriculation and attained the rank of sergeant air-gunner. After the war he took a refresher course with the hope of entering university, but soon gave up this plan because he felt that he could not once again become interested in studies. During the period from 1946 to 1950 he held six different office positions; his usual reason for leaving was that the work did not suit him. He has been at his present job for four months, and is fairly content with it. He met his wife in 1949, and they were married after a year's courtship. Their first child was born a year after the marriage, and although he was not too happy about the prospect of this child at that time, he accepted it as being expected of him as a member of the Roman Catholic Church. At the time of admission his wife was in the eighth month of her second pregnancy. The expected arrival of this child created many problems for him. He was then earning $40.00 a week and paying $30.00 a month in rent for quarters which would not be adequate for his enlarging family, and which would have necessitated his finding larger quarters at a higher price.

At the time of his first examination in the out-patient department he appeared alert, apprehensive, but in no distress. He was well-built and well-nourished. His temperature was 98.6°F; his pulse rate 80 per minute; his blood pressure 115 m.m. systolic, 80 mm. diastolic; and his weight 164 pounds.

The only significant findings were made during the neurological examination. There was a bitemporal field defect, which was inconstant on repeated trials. Later examination on a tangent screen, showed the loss to be circular and increasing concentrically on repeated examinations. There was no nystagmus.

The patient was co-operative and fully conscious. He is left-handed and not aware of any attempts being made to correct this. The examination of the cranial nerves with the exception of the fifth showed nothing remarkable. There was no decrease in the motor power of the fifth nerve. There was a hemianesthesia involving the entire right side of the body including the face. All modalities of sensation were affected except sense of position and passive movement. The sensory impairment was variable on different testings and often extended across the mid line. The corneal reflexes were active and equal. There was no loss of power or impairment of co-ordination. Tendon reflexes were present and equal, plantar reflexes were flexor.

Laboratory examination revealed a normal hemoglobin, a normal sedimentation rate, normal electro-encephalogram, normal cerebro-spinal fluid and normal skull X-rays.

On a subsequent physical examination held three days after the first, there was a generalized decrease of power on the right side. This loss of power was variable and inconstant. He showed a positive Romberg sign, falling to the right side when his eyes were closed. When testing vibration appreciation over the

head it was noted that it became abruptly appreciated on reaching the mid line when passing from the right side of the forehead to the left.

After being seen by several doctors on Monday, October 22, he developed a severe headache, which seemed justification for his presence in hospital. This headache was supposedly severe, yet he looked perfectly well, and was able to wander all over the ward.

SUMMARY

The problem in diagnosis presented by this case is that of a twenty-six year old man of inadequate character, but good intelligence who suffered a severe headache one year before admission to hospital. The first episode came at the time of arrival of his first child, a child which he did not really want. Six months before admission to hospital he had a second severe headache. One week before admission to hospital he had a third attack of headache, which coincided with the anticipated arrival of his second child. The arrival of the new child posed a great problem, since it necessitated his finding larger living quarters which would be more expensive than his present lodging. On examination he was found to be normal except for a right-sided hemianesthesia, imperfectly reproducable, to pain, deep pressure, heat and cold, vibration but not to sense of position. He showed an hysterical type of field defect.

DIFFERENTIAL DIAGNOSIS

(1) Fronto-parietal space occupying lesion.
(2) Hysteria or malingering.
(3) Migraine.

Fronto-parietal space occupying lesion: The finding of a hemianesthesia involving superficial and deep sensation yet sparing postural sense cannot be explained on an anatomical basis, but is commonly seen in hysteria. The fact that it was variable and influenced by suggestion gives further support to it being of hysterical origin in this patient. Since the patient had no complaints referable to his right side when he came for examination because of headache, it can be assumed that the hemianesthesia was the result of suggestion given by the first examiner. With repeated examinations it became more marked and hysterical weakness became added to the picture. Further, since the bones of the skull are in continuity with each other, it is not reasonable for vibration sense to be lost in one half and yet perfectly preserved in the adjacent half of the frontal bone. The headache of cerebral neoplasm is usually more gradual in development, often being present on awakening in the morning, and lessening as the day progresses. In this case the headache was episodic and described as a pressing heavy sensation, rather than an actual ache. The association of the recent headache with vomiting was the feature that was most disturbing and made investigation necessary.

Hysterical psychoneurosis: The hysterical reaction may be defined as one where the patient answers the difficulties of his environment by a negative response, an under-reaction. This reaction is of such a nature that it is clearly impossible for the patient to continue in the performance of his duties for the time being. The reasons for the occurrence of this reaction pattern can only be elucidated by a thorough understanding of the patient. The difficulties which have befallen him, might in a more

stable person lead to nothing more than slight depression. In this patient they led to the development of an hysterical psychoneurosis.

Malingering: Theoretically, the difference between this and hysteria is based on whether the patient is conscious that he is shamming. As a matter of practice a patient with apparently hysterical symptoms should never be accused of malingering. Even if he is, the reason why he is malingering needs enquiry just as much as why he has an hysterical hemianesthesia; and if the accusation is made there is not the slightest chance of that patient, whether an hysteric or a malingerer, going on further with that doctor.

Migraine: The three acute episodes of headache, starting on one side and accompanied on at least one occasion by vomiting suggest migraine. The presence of this condition cannot positively be ruled out at the present time.

CLINICAL DIAGNOSIS

Hysterical psychoneurosis.

PROGNOSIS

It is difficult to prognosticate in these cases. It may be that with treatment he will undergo complete recovery and make a successful readjustment to life. It is felt however that even with recovery this time, he will at some future date, under similar stress, show an anxiety or an hysterical reaction.

TREATMENT

This patient was transferred to the Wellesley division of the Toronto General Hospital for psychiatric management.

ACKNOWLEDGEMENT

It is a pleasure to acknowledge the valuable assistance of Doctor H. H. Hyland during the preparation of this report.

STUDENT—STAFF CURRICULUM COMMITTEE

The recent decision of the Medical Society Assembly to set up a student-staff curriculum committee is a sound one. In a faculty of nearly one thousand students, there are bound to be some who have ideas about the ways in which the course of study may be improved. In the past, it has been very difficult to bring these views to light because there has been no mechanism through which they could be expressed. Now, with the formation of this new committee, it is hoped that the undergraduates will avail themselves of the opportunity of suggesting the changes that they desire, and thereby have a hand in shaping their own destiny.

M.L.A.A.

ACCLIMATIZATION AND THE REACTIONS TO LOW TEMPERATURE

D. G. BAKER, B.A.*

THE PHYSIOLOGICAL RESPONSE to cold has been the subject of very intense investigation for the past decade. Accelerated by the requirements of national defense, several aspects of the problem have received particular emphasis; first, the consideration of clothing and protective equipment necessary to conserve heat; and second, the more fundamental topic of acclimatization and thermoregulation in the intact animal. In the space allotted to this article a few general remarks on the latter subject will be made; the former has been covered already in two very excellent volumes by Newburg and Harris (1) and more recently by Bazett (2) and his colleagues.

In the past, numerous authors have described signs of acclimatization to heat in human subjects (3, 4, 5, 6, 7). Very little, however, has been done in the direct study of cold adaptation in man. Glaser in 1949 (8) investigated the effect of heat and cold on body temperatures, pulse rate and other bodily functions in healthy young adult males. Since that time extensive data has become available on the effect of cold stress in animals which may be indicative of similar changes in man. This data indicates clearly that whatever the mechanism involved, a new physiological equilibrium must be quickly reached, in which all the bodily processes participate, or the animal rapidly reaches a precarious state of health. The overall effect of this adjustment is to maintain the same constant internal environment characteristic of the particular species involved. The nature of the adjustment is at present the subject of extensive research in the Department of Physiology at this University.

When a normal adult albino rat reared at a temperature of 25°C is placed in a temperature of 1.5°C, the most apparent reactions are those associated with the maintenance of body temperature (11). Once in the cold, those animals which fail to maintain their normal temperatures die showing the hypothermia syndrome, usually within the first day or so. This is associated with a considerable loss of weight, apathy, muscular weakness, terminal hypoglycemia, and progressively declining body temperatures. Those animals which can maintain their body temperatures and appear to be in good health after six weeks of continuous cold exposure are considered to have become acclimatized.

Immediately on placing the normal adult animal in a cold environment, (1.5°C ± 1°C) the metabolic rate, as measured by the oxygen consumption, begins to rise, and in a very few minutes may reach a new level of two or three times that observed at the critical temperature of the animal (9). When the cold-acclimatized animal is left at room temperature, the MR may remain elevated for a considerable time. While much of this increase can be accounted for by increased muscular tone, signs of visible shivering are absent. Animals

*Dept. Physiology, University of Toronto.

under anesthesia (barbital, ether, etc.) are not able to maintain their body temperature. Very recently, *in vitro* studies on tissue slices, using the Barcroft-Warburg technique, have produced direct evidence for an increased MR in the visceral tissues of the cold acclimatized rat (10), as shown by oxygen consumption.

The changes in metabolic rate are accompanied by a greatly increased food consumption; where a choice of diet is available, the additional caloric intake is largely fat. In spite of this, growth in the cold is greatly retarded. Growing animals in the cold gain weight only at about half the rate of their room temperature litter mates of the same weight and sex, and on the same diet. Possible sex differences are at present under investigation.

You, You and Sellers (12) have shown that in the cold there is an immediate increase in the excretion of nitrogen and that this does not depend on either the thyroid or adrenal glands. In the cold there is an accelerated protein catabolism whatever the level of the protein intake. Gluconeogenesis is thought to be a significant factor in this regard, possibly due to the increased liver activity and the accelerated demand for metabolites to supply the energy to maintain heat production.

For prolonged survival in the cold, however, both the secretions of the thyroid and adrenal glands are indispensable (11). At room temperature, the adrenalectomized rat, kept in salt balance, will live several months. At a temperature of 1.5°C these animals survive only a few hours but can be maintained by daily injections of cortical extracts. Qualitatively, this same situation holds in the case of the thyroid. Within a few hours of exposure to a cold environment, demonstrable changes in the adrenal cortex occur (13), while the thyroid takes slightly longer before direct evidence of hyperfunction is apparent. In the acclimatized animal, hyperplasia of these glands is invariably found. In the adrenal gland of cold acclimatized rats, the average weight amounts to about twice that found in the room temperature animal and an increase of about 50 per cent in the case of the thyroid. The importance of these two glands has recently been demonstrated in a very direct manner (14). Healthy adult rats, deprived of their fur (insulation) by clipping, and placed in the cold, die in a few hours. These same animals, if given suitable amounts of both thyroxin and cortisone for several days previous to, and during the first weeks of, their cold exposure usually survive. In this instance, both hormones are necessary to increase significantly the survival rate.

There is good evidence that the reaction of these glands is stimulated by the corresponding trophic secretions of the pituitary (9). Initially, this sequence of events does not differ appreciably from the general reactions to other forms of stress except with regard to heat production. In the case of the acclimatized animal, the situation is somewhat more complicated. The part played in acclimatization by the other endocrine glands is not so obvious. It is reasonable to assume, however, that the changed metabolism must result in a corresponding response by these tissues.

That the central nervous system is of fundamental importance in response to cold is without question. Folkow, Ström and Uvnäs (15) have again confirmed that certain hypothalmic nuclei are sensitive to small changes in temperature.

Blood flow in the limbs of cats was examined and shown to be considerably increased by hypothalmic warming. Direct evidence of this nature, and a vast array of less direct observations, suggest that the hypothalmus contains the principal thermoregulatory mechanism of the body and that it is the temperature of this organ that the body tries to maintain. To date, the direct measurement of hypothalmic temperatures has not been extensively carried out but offers a very promising reward for future investigation. The real function of the central nervous system in cold acclimatization remains as yet too obscure for profitable discussion in this article.

SUMMARY

The criteria of acclimatization to cold in a typical laboratory animal (adult albino rat) have been defined. The immediate reactions to a cold environment have been described and the changes after acclimatization have been briefly mentioned. Evidence for the possible role of certain of the endocrine glands in cold acclimatization has been given and briefly commented on, in view of the researches currently in progress at this University.

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"A DRINK TO BE GIVEN A MAN POSSESSED OF THE DEVIL"

For a friend-sick man or demoniac; when a devil possesses a man or controls him from within with a disease, a spew drink of lupin, bishopwort, henbane, and cropleek, pounded together, adding ale for liquid. Let it stand for a night; add fifty lib corns or cathartic grains and Holy Water.

Medicinale Anglicum (Tenth Century)

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EDITORIAL

CONCLUSION

IN THIS, the final issue of Volume XXIX, we would like to express our gratitude to all those who made this publication a success during the past year.

Thanks go to all the graduates, members of the staff, and undergraduates who gave up some of their valuable time to write articles. The students in particular deserve praise; despite a very slow start, they nevertheless managed to write more than sixty per cent of all the papers printed this year, a gain of ten per cent over last year. To those undergraduates who had their papers rejected, we can only say: do not be discouraged, but seek to improve your style, remembering that brevity, exactness and proper grammatical form are the criteria for a satisfactory article in any field.

To the staff of the JOURNAL who were compelled to work for a slave-driving editor, we offer our sympathy, and best wishes for success in the coming year with the new editor-in-chief. May the records in advertising and circulation that were established this year through the efforts of a small but valiant crew be surpassed, and the quality of the printed matter rise to even greater heights.

A debt of gratitude is owed to all our subscribers and advertisers who remained loyal to the JOURNAL throughout the year, in spite of strikes, and other unforseen circumstances. Without their support, this publication would not have been able to carry on.

Finally, we wish to express our thanks to Mr. Hart at the Toronto General Hospital for his many services, and to the staff of the University of Toronto Press who took such a personal interest in the JOURNAL despite its badgering publisher.

FEATURE

THE CLASS OF 5T2

A. L. HALPERN, 5T2, AND JEAN GRIFFIN, B.A., 5T4

On the basis of 105 returns from 175 students (60 per cent) we are able to present a fairly accurate picture of the graduating class, 5T2. Tables I, II and III show a comparison between this class and the three preceding years. In interpreting the significance of this comparison one must bear in mind that ex-servicemen and women comprise 63 per cent of the class, and the course was a six-year one.

TABLE I

	5T2	5T1	5T0	4T9
Total	175	173	158	156
Men	96%	82%	95%	84%
Women	4%	18%	5%	16%
Married	42%	19%	39%	18%
Ex-service	63%	22%	81%	15%
Navy	17%	6%	13%	6%
Army	16%	3%	25%	1.5%
RCAF	30%	13%	43%	7.5%

The average age, 27 years, is the highest recorded in six years of final year polling (Table II). This no doubt partly explains the fact that no more than 12 per cent of the class expects to take more than two years of interneship, as compared to 63 per cent of the class of 4T7 in which the average age at graduation was 23 years.

Fully 24 per cent of the class (as compared to 7 per cent of 5T1) were born in countries other than Canada. These include Australia, China, Denmark, England, Japan, Poland, Roumania, United States and the West Indies.

As in former years, Sports and Music take first place as hobbies and recreational activities. However, while card-playing was one of the favorite hobbies of 5 per cent of the class of 5T1, it loomed high in the recreational activities of 15 per cent of 5T2, and this probably accounts for the fact that most of the students in the senior years had

TABLE II

Age in Years	5T2	5T1	5T0	4T9
	%	%	%	%
21	..	..	..	4
22	1	1	2	35
23	9	25	6	24
24	12	41	17	11
25	12	11	18	8
26	11	4	19	2
27	15	8	12	
28	11	3	15	16
29	5	2	9	
30 and over	24	5	10	
	55	18	46	
Average	27	24	26	23

to look for a place to eat their lunches elsewhere than in the Students' "Lounge" at the T.G.H. Other recreational activities engaged in by many are reading, dancing, photography, stamp collecting, movies, painting and chess playing. No less than 5 per cent of the class have no hobbies other than Medicine. 10 per cent regard drinking as one of their favorite pastimes, while the only recreational activity of one stalwart is "sleeping".

A highlight of this year's survey is the fact that 61 per cent report that they have professional or technical training equipping them to take up gainful employment in fields other than Medicine.

Among the occupations in which members of the class have been proficient are cartography, embalming, farming, teaching, nursing and carpentry. No less than 5 per cent could make the tragic move of taking up highly remunerative positions with engineering firms.

Medicine outranked the other major clinical subjects from the point of view of enjoyment by the student. Obstetrics and Gynecology was a close second. Most of the class enjoyed Pathology and Anatomy more than the other basic subjects. The question "What clinic or laboratory class did you think was best organized?" brought the following response:

Pathology	29%
Anatomy and Neuroanatomy	20%
Pediatrics	12%
Medicine	11%
Pathological Chemistry	10%
Pharmacology	5%
Physiology	3%
Histology	3%
Hygiene and Preventive Medicine	3%
Bacteriology	2%
Dermatology	1%
Surgery	1%
	100%

Most students reacted unfavorably to one or more of the subjects taught. These are, in order of criticism:

Pathological Chemistry	++++
Surgery	++++
Physiology	+++
Hygiene and Preventive Medicine	+++
Biochemistry	+++
Obstetrics and Gynaecology	+++
Psychiatry	++
Oto-laryngology	+
Bacteriology	+
Pharmacology	+
Ophthalmology	+

As a whole the reaction to the premedical course was unfavorable. "The time-table should have subjects added to give the students something to worry about and thus prepare them for the shock of 1st Meds.," stated one student. "1st Premeds. was an absolute waste of time and money if you went to fifth form and paid any attention at all; in fact, it was not even as good as high school because there was no individual teaching," wrote another. Those who approved the course felt that one intensive year of study would have sufficed. Others suggested that the course should be extended another year, lead to a B.A. degree, and offer to the student additional subjects such as Sociology, Economics, Law and History of Medicine.

The class of 5T2 will contribute more general practitioners than any of the preceding years polled (Table III); however, in view of the high average age, one should not expect such a large number in future years.

TABLE III

	5T2	5T1	5T0	4T9
	%	%	%	%
Undecided	7	8	16	4
General Practice	74*	61	56	56
Specialty	19	29	28	40
Internal Medicine	7	4	2	5
Obstetrics and Gynaecology	6	4	1	2
Surgery	3	10	8	8
Psychiatry	2	3	1	6
Teaching and Research	1	2	1	2
Others	..	6	15	17

*Includes 6% who have joined the Armed Forces and 2% who plan to be medical missionaries.

81 per cent of the class expect to interne in Canada, 8 per cent are undecided, and 90 per cent expect to practise in Canada with 5 per cent undecided. To the question "Would you like to practise as part of a group?", 79 per cent replied in the affirmative and 10 per cent were uncertain.

Several of the questions were purposely made thought-provoking and the answers reflect the general temper of

the class. Many felt that student-staff relations could be greatly improved. One student, echoed by many, suggested that staff men should be assigned as "counsellor" to groups of students early in the medical years. "Less formal lectures; more tutorial groups," said another.

Most of the class entered medicine to give service to the community and because of interest in science. Prestige and financial reasons were less motivating factors.

After four years of association with the medical profession, many students felt that earlier impressions had been altered. The general view is that the halo has disappeared. "I have learned to accept it as being a profession composed of normal (erring) human beings," said one. "The humbleness of a few and the arrogance of many," stated another. "The strongest union in the world!" suggested a skeptic.

The effect of the medical course on the general values of the student was an increase in tolerance towards and understanding of his fellow man. "It has augmented my sense of responsibility to mankind" is typical of the remarks made in this connection. "Quite a strong influence against religion and consequent reappraisal of values" reflected the minority view.

The D.V.A. program was hailed by all students and the questionnaires sang with gratitude and appreciation. One consistent note ran through all the comments: the scheme should be extended to all Canadian students qualifying by merit.

In summary, the average student of 5T2 is 27 years of age, with approximately three years' service in the Armed Forces, married or about to be, and intends to enter general practice after one year of interneship. He is more mature, has more responsibilities than his predecessors, and looks forward with eagerness to serving his community.

MANUSCRIPT EDITING SERVICE ESTABLISHED

To improve medical journalism, the American Medical Writers' Association has recently established the first "Manuscript Editing Service" to be conducted by a medical association in the U.S. For a small fee the Association will edit and criticize medical manuscripts (up to 5,000 words). Its aim is to help authors carry out the dictum of Sydney Smith: "The writer does the most who gives his reader the most knowledge and takes from him the least time." The Association is a non-profit organization with no salaried officers. Its membership includes a large group of well known medical editors and writers. Principal purpose of the group is "to help maintain and advance high standards of medical literature." Further details of the new "Manuscript Editing Service" may be obtained from the Secretary, Harold Swanberg, M.D., 209–224 W.C.U. Building, Quincy, Illinois.

THE TORONTO GENERAL HOSPITAL TODAY

J. W. GOODWIN, 5T5

THE BACKGROUND

The name "Toronto General Hospital" has been associated with the city's foremost medical service since 1854, when the original building of that name was built on the corner of Gerrard and Sumach Streets. This structure replaced the old York General Hospital which had stood on King Street since 1820. The first Toronto General Hospital soon found itself in desperate times and until 1877, when it was extensively modernized with the generous aid of such colourful Toronto citizens as Messrs. Cawthra, Gooderham, Worts, and MacDonald, it was in continual financial distress.

The Hospital weathered the storm of Listerism and the coming of aseptic surgery, and served the city's sick until 1913, when the present building was completed. The site for the Hospital was purchased for the comparatively high cost of $550,000. Two streets and over two hundred houses were necessarily torn up. The total cost including the site was approximately $3,600,000, exceeding by nearly $1,000,000 the original estimate. However, many generous donations from the wealthier citizens enabled the realization of this amount. Possibly the two most important contributions were those of a surgical wing by Mr. (later Sir) John C. Eaton, and of a medical wing by Mr. (later Sir) J. W. Flavelle. When the Hospital was completed, it was, by 1913 standards, an entirely adequate institution, well equipped and appointed and providing beds for nearly seven hundred patients. In his book[1] on the history of the Hospital written that year, Dr. C. K. Clarke (the superintendent) noted enthusiastically:

"Generally speaking, the Hospital has an equipment that embodies all the modern demands and affords an opportunity for . . . the teaching of students almost unequalled."

Unfortunately, the object of his admiration has become more and more obsolete with the years as witnessed by the following statement from his book:

"The basement of the main group is the centre of a great number of activities, in the Medical, Surgical and Administrative Departments. In the west end (is) located . . . the large amphitheatre for clinics; also accommodation for students, both male and female."

The inadequacy of these accommodations today need hardly be commented upon.

THE TREND

During the year 1950, for instance, the number of bed-patients was 25,886, doubling the number for 1928. The number of emergency cases treated at the Hospital has increased from 6,000 in 1928 to approximatey 21,000. The Out-Patients Department gave 92,773 treatments, a sevenfold increase since 1913. In the six operating rooms, including one in the basement, 9,700 operations were performed. 91,292 laboratory tests were carried out, nearly three times the number done in 1940. These figures illus-

trate a change with which the Hospital has barely been able to cope.

A description of the congested wards and quarters, the lack of sufficient number of hospital beds, the decentralization of the specialty services and the dangerously undersized emergency department, to mention but a few inadequacies—have been well circulated to the public through the press and the popular literature distributed by those managing the present campaign.

Perhaps not as well known are those difficulties peculiar to the medical students and their clinical teachers. In lieu of any proper place for clinical discussion, the clinician is, in some instances, forced to discuss cases in the narrow halls outside the wards, where the X-ray viewing boxes are located. The simultaneous presence of doctors, students, nurses, patients, and equipment causes congestion in the extreme, to say nothing of the poor impression created on patients and visitors. Due to the grossly inadequate space, clinical laboratory work, which should be done on the wards, has been neglected by the students and even storage space for microscopes is at a premium.

The largest lecture room in the Hospital is often filled to capacity, forcing the students who arrive late to stand throughout lectures and clinical presentations.

The present lunchroom, which scarcely deserves the name, is undersized when one realizes that it is the only such place provided in the Hospital for at least one hundred and possibly three hundred students of the senior years. In size, it is no larger than an average living-room and a good proportion of this space is occupied by coat-racks. The few small tables in the space remaining further decreases the room's capacity.

THE CAMPAIGN

On October 1st, 1951, the initial work on the first appeal for funds by the Toronto General Hospital in forty years, was begun. The objective of the fund was set at $14,000,000. From its inception, the campaign evoked wide-spread interest and soon surpassed its goal by several million dollars.

PROPOSED IMPROVEMENTS

The first of the improvements to be undertaken will be the building of a four-storey public-patients wing, which is to extend backwards from the central portion of the present structure. It is to cost an estimated $4,035,000. Thirteen operating rooms will be built on the ground floor, of which two will be devoted to neurosurgery and two to orthopedic and plastic surgery. In conjunction with these, a recovery ward of twelve beds and X-ray, pathological and electroencephalography services will be provided.

On the second floor, a special ward for neurological and neurosurgical patients will enable the centralization of a now very decentralized service, including the specialist nurses required by such patients.

Until the proposed eye and gynecological services can be built, the patients admitted to these services, together with that of the ear, nose and throat department will be assigned to the third floor of the new extension. The fourth floor will be the location of new accommodation for the Hospital's large staff of internes.

Below the ground floor will be a basement and a subbasement. Here will be located three lecture rooms, the largest having a capacity of two hundred and fifty. Certainly of interest to the students will be an adequate common-room,

men's and women's cloakrooms and a snackbar.

The space to be made available in the present building by the transfer to the new extension of the services mentioned, particularly that occupied by the operating rooms will be converted into clinic rooms, single room accommodation for seriously ill patients, service rooms, secretaries' offices and storage space.

The wards are to be completely modernized along the lines of the newly renovated G Medical Ward. Among the features of this renovation are glass-enclosed nurses' stations located adjacent to the wards. These will enable an efficient yet quiet combination of observation and the handling of records, reports and telephone communication. The much-needed clinical laboratories will be built into the basement of the present medical wing, together with a metabolic investigation unit. A new library is proposed but its location has not been decided as yet.

With the advent of modernized wards, increased centralization of patients according to services, clinic rooms and laboratory space, the present teaching difficulties should be largely eliminated.

A completely new department building for rehabilitation and physical medicine will be located between the present Flavelle medical wing and the emergency department. Among its facilities will be a medical gymnasium, a therapeutic pool, and social service and employment offices. This installation will cost approximately $250,000.

A third addition will be an $800,000 four-storey admitting and emergency building which will include a 75 bed ward for chronically ill patients and a 20 bed active observation ward. The present admitting and emergency building will be torn down and the new department built on its site. While this work is being completed, the new rehabilitation building will act as temporary quarters for the department.

Both the hospital laundry and kitchens are inadequate at present. They will be completely renovated and modern equipment installed.

When the former Sick Children's Hospital is torn down, three new units will be built on its site. These will be a building to provide an obstetrics and gynecology service, an eye service unit and a nurses' residence to accommodate two hundred. This group will cost an estimated $4,450,000.

The old residential building of the Wellesley Division will be torn down and a new $1,000,000 wing built on its site adjoining the new central building of the hospital. On completion of this wing, the two divisions of the Hospital will boast an 1,800 bed capacity, the largest in Canada.

CONCLUSION

In the closing paragraphs of his excellent history, Dr. Clarke made a statement which, in the year 1913, could be but mere speculation:

"One wonders if the next century will be as full of marvels as the last has been, and whether these hospitals (the present Toronto General Hospital and the old Sick Children's Hospital) will be as much of an anachronism in (the year) 2013 as the York General Hospital would be today."

History has all but made a certainty of his speculation in less than half the time he supposed it might.

It is a pleasure to acknowledge the kind assistance of Dr. R. F. Farquharson.

ABSTRACTS

SURGERY

Multiple Primary Malignant Tumors Involving the Colon and Rectum: Harry E. Bacon, M.D. and Michael C. Tavenner, M.D. The American Journal of Surgery, 83: No. 1, p. 55-63, Jan. 1952.

Multiple primary malignant neoplasms which have been classified among the rare conditions are probably more frequent than the reported statistics indicate. A review of the literature shows that one malignancy apparently does not confer a clinically determined immunity against another malignancy. In fact, a person who has had one malignant neoplasm is more likely to have another than a person who never has had a malignant tumor. Adenomatous polyps of the colon and rectum bear definite relationship to carcinoma of these organs.

The authors describe a personal series of 1,112 consecutive cases of cancer of the colon, rectum and anal canal in which there were 84 instances of multiple primary malignancy; an incidence of 7.5 per cent. Two cases of adenocarcinoma coexisting with sarcoma are reported. One case had adenocarcinoma of the sigmoid with reticulum cell sarcoma of the stomach. The other case had adenocarcinoma of the rectum with rhabdomyosarcoma of the uterus.

Among the 35 women in the entire series 40 per cent had primary malignant neoplasia of the lower bowel with coexisting primary tumors of the genital organs or breasts. The authors recommend castration of female patients forty or more years of age at the time of resection.

Contributing factors which probably influence the progressively rising reported rate of multiple primary malignant neoplasms are given as the changed concept of what constitutes a multiple primary malignancy, the increased life expectancy of man, the increasing number of people surviving a radical procedure for cancer long enough to develop another, the education of the medical profession and the laity, and improved clinical procedures.

G. Y. Hiraki

Complete Transposition of the Great Vessels: Astley and Parsons, Br. Heart J., 14: No. 1, 13-24 (Jan. 1952).

The authors discuss complete transposition of the great vessels and compare this with the similar, less commonly fatal, more successfully operable Tetralogy of Fallot.

The relative positions of the aorta and pulmonary artery are reversed in complete transposition. Venous blood flows into the right heart but is returned immediately to the aorta. The oxygenated blood passes from the pulmonary veins into the left heart but is pumped, via the pulmonary artery, back to the lungs. The two circulations are independent; survival is possible only if other cardiac defects allow shunts of blood from each circuit to the other.

The incidence of complete transposition is about 10 per cent of all cases of congenital heart disease, and the mortality is very high (9 of 16).

The diagnosis, especially with regard to distinguishing of this anomaly from Fallot's Tetralogy is discussed and some suggestive, but not necessarily pathognomonic features are noted. Most important of these is the rare differential cyanosis of the upper and lower extremities, it being found that the color and distress of such infants is only rarely improved by placing them in the knee-elbow position or by administering oxygen.

Many of the contradictory views on the radiologic aspect are dealt with and are well illustrated, although the authors find only three really significant diagnostic findings. These are:

(a) a narrow vascular pedicle;
(b) the bulge of the transposed ascending aorta appearing as the left middle segment;

(c) the association of pulmonary plethora (congestion) with a concave left middle segment.

Angiocardiography (with diodone), E.C.G. and cardiac catheterization are also used in examination of this condition and their relative merits are considered. The physiology of the various shunt mechanisms is treated briefly; the prognosis is said to be very poor, except when there is a septal defect present.

The most successful operative treatment consists of opening the right superior pulmonary vein into the right atrium, creating an atrial septal defect and anastomosing the proximal end of a subclavian artery to the distal end of a pulmonary artery. Two thirds of the infants treated in this manner survived and improved.

F. P. Ceresney

PSYCHIATRY

Prevalence of Psychiatric Illness in a Medical Outpatient Clinic: Roberts, B. H. and Norton, N. M., New Eng. J. of Med., **246**: 3, 1952.

In this study the authors wanted to determine the incidence of psychiatric problems in the general population. Having found that 72 per cent of their sample had psychogenic factors as a basis for their complaints, they studied the medical management of these patients.

The investigation was conducted on 50 patients admitted to "a university hospital located in a medium-sized New England city". These people—29 women and 21 men—were given a psychiatric investigation as well as the routine medical examination of the outpatients department.

The psychiatric examination was conducted by a psychiatrist and a psychiatric worker. It consisted of posing the patient specific questions—"Do you ever have a lump in your throat?"—and following up any positive findings. In this assessment, over 72 per cent were diagnosed as having some form of psychiatric upset.

The investigation concluded two months later in an analysis of the work done on these 50 people by the medical staff. This showed that 80 per cent of these patients were diagnosed as having a psychic basis for their complaints, but, in contrast to the psychiatric assessment, these were diagnosis of exclusion. These authors pointed out that "frequent recourse to organic investigations and consultations is an anxiety reducing procedure for the clinician faced by a functional complaint." Consequently, in 29 of the 40 patients declared to be suffering from psychiatric complaints many costly investigations were conducted. These included, X-rays, basal metabolism studies, one electroencephalogram, and one renal function test. Furthermore, medicines such as belladonna, phenobarbital, and benzedrine were prescribed. Five of these 40 also had a history of surgery. For example, laparotomy, cholecystectomy and a subtotal gastric resection were considered indicated on the basis of these psychogenic symptoms. However, there was no consequent relief of symptoms.

A. I. Cunningham

Nonaphasic Misnaming (paraphasia) in Organic Brain Disease: Weinstein, E. A. and Kahn, R. L., A.M.A. Archiv. of Neur. and Psych., 7: 1, Jan. 1952.

This study was made on thirty patients with organic brain disease who exhibited paraphasia, a type of language disorder in which an incorrect term is used for the proper name of an object. This phenomenon differs from aphasia in that speech has normal rhythm; there is no awareness of errors; correction leads to no improvement; and there is no associated anxiety.

In almost all cases the substituted name was related to the object in terms of function or structure, e.g. a "radiator" was called a "stove", a "tongue depressor" was called a "ruler". Misnaming most frequently occurred with objects bearing a relation to the person's illness, e.g. doctors were referred to as "white-collar workers", "bartenders", or "lawyers".

Paraphasia apparently represents a change in perceptual as well as symbolic function. In 16 of 17 patients, if two cutaneous stimuli were applied simultaneously one was completely excluded or displaced to another part of the body.

The misnaming was never an isolated phenomenon; certain behaviour changes were always noted such as disorientation, delusions, and mood changes.

The intracranial disease consisted mainly of bilateral or deeply situated tumors and aneurisms with subarachnoid hemorrhage.

Paraphasia should not be classified as an aphasic disorder. In aphasia the difficulty lies in associating an object with its referrent symbol. In paraphasias, on the other hand, words used have high symbolic content; the misnaming of the object seems to be a means of expressing some individual experience or emotion. This is a manifestation of a more general change in behaviour rather than a defect in symbolic formation.

Although paraphasia occurs with organic brain disease it is seen in many normal persons; slang and nicknames perhaps represent a form of it. The pathologic process does not in itself produce paraphasia but may exaggerate a normally occurring mechanism.

J. B. Redford

MEDICINE

Generalized Osteoarthritis and Heberden's Nodes: Kellgren and Moore, B.M.J., Jan. 26, 1952, p. 181.

From 391 cases of polyosteoarthitis, the authors were able to classify a group under the heading of primary generalized osteoarthitis. It was recognized that the nodes so often seen over the distal interphalangeal joints of the fingers represented neither rheumatoid nor degenerative arthritis. This entity had previously gone under different names, such as "nodosity of joints" and "menopausal arthritis."

The affection is commonest in middle-aged women and is most frequently found in the distal and proximal interphalangeal joints, joints of the feet, the knee and hip joints, and the spine. Each affected joint passes through an acute stage with redness, increased warmth, and marked tenderness, and a chronic phase with bony outgrowths months later. The massive soft-tissue swelling and synovial thickening of rheumatoid arthritis is not seen. In the acute stage, a burning tingling pain, resembling whitlow pain is present. In the chronic stage there is little pain, and there is a fair range of movement and function.

Three cases are carefully reviewed to demonstrate the clinical findings. For the whole group the E.S.R. had a mean value of 19 mm. Soft tissue lesions, vasospasm, and eye lesions were absent. The disease was confined largely to the joints, especially the diarthrodial joints. Neither marked obesity nor hypertension seemed to be a feature of generalized osteoarthritis.

X-rays were typical of osteoarthritis—narrow joint space, sclerosis of subchondral bone, and bony outgrowths at articular margins. Characteristic in this disease was a combination of Heberden's nodes and arthritis of the first carpo-metacarpal joint. The knee joint was narrowed and presented rounded "molten wax" bony outgrowths at the articular margins.

The patients were treated with estrogen, but this form of therapy failed to influence the arthritic process. The authors believe that generalized osteoarthritis may result from an inherited defect, and should be regarded as a constitutional disease.

M. Wasylenki

The Recognition and Treatment of Hepatic Amebiasis: Zavala, D. C. and Hamilton, H. E., Annals of Int. Med., 36: 1, Jan. 1952.

Hepatic amebiasis presents such a variable and multiple symptomatology that early diagnosis is often missed. Such delay causes increased morbidity and mortality. From their experience in treatment of 28 cases, the authors discuss ways to facilitate recognition and management of the disorder. Seven cases are presented to illustrate the complicated problems in making a diagnosis.

Since amebic abscess of the liver and amebic hepatitis are indistinguishable clinically, the conditions are collectively referred to as hepatic amebiasis. The important features which aid in the diagnosis are:

1. Enlarged, tender liver. Of 184 cases

studied by Baher, 95 per cent had tender livers; 83 per cent had definite hepatomegaly.

2. Fading suntan complexion of the skin especially over the face and forehead, also over the flexor surfaces of the wrists, body pressure points, and skin creases.

3. Fluoroscopy showing elevation or fixation of the right leaf of the diaphragm.

4. Little or no change in liver function tests.

5. Positive complement fixation tests, with a fall in titre following specific amebicidal therapy, and specific therapeutic response, confirm presumptive diagnosis.

Vioform, chinoform, diodoquin, and other drugs have local action on contact with the bowel wall. Chloroquine and emetine are specific for amebic hepatitis and abscess. Chloroquine's high therapeutic effect and lack of toxicity render it superior to emetine. Treatment of choice is chloroquine always in combination with a local amebicidal drug, preferably diodoquin. Secondary infection requires appropriate treatment with antibiotics. Of 15 patients receiving intermittent or alternating treatment a total of seven relapses occurred. There were no relapses in the group of 11 patients on the above combined therapy of chloroquine and diodoquin.

B. Sisson

Problems of Homologous Serum Jaundice after Plasma Transfusion: Allen, J. G., A.M.A. Archives of Surg., 64: 1, 1952.

The incidence of homologous serum jaundice is sufficiently high in plasma transfusions (15 per cent) for many to discontinue using plasma in treating shock and hypoproteinemia. A small amount of infectious plasma can contaminate a large pool with the result that nearly every pool of 150 donor size is contaminated. Small pools are preferable but expensive and technically difficult. A method is needed to render plasma non-icterogenic without disturbing its therapeutic properties. Use of plasma sterilized by ultraviolet light, ionizing irradiation, and chemical agents has not prevented the occurrence of this virus infection.

No cases of jaundice were seen in 960 patients using a serum produced in the Chicago Blood Bank with an average pool size of 48 donors and ranging up to a maximum of 776 donor size. Three quarters of the cases were followed for from 4 to 6 months. Other investigators have all found a higher incidence of jaundice in plasma transfusions.

The Chicago plasma was stored 3 months or more at room temperature in the liquid state using no preservatives. Survival studies indicate viruses die out by this method, whereas with lyophilized and frozen plasma they are kept in suspended animation, such plasma remaining infective for years. Plasma stored in the liquid state showed no apparent changes in its therapeutic properties and remains useful up to three years.

Critical experiments are required to prove the accuracy of the observations, along with biochemical and physiological studies of the properties of stored plasma.

J. C. Varley

Amebic Dysentery: Shookhoff, Howard B., The Review of Gastroenterology, 19: No. 1, Jan. 1952.

The author's purpose is twofold i.e. (1) to present some modern concepts on the clinical and laboratory diagnosis, (2) to discuss therapeutical measures old and new. He presents the clinical picture of three groups of patients (a) those whose symptoms were realized only after they had received treatment, (b) those who presented only vague symptoms, and (c) those in whom the symptoms of the disease were more definite. The author refutes the belief that asymptomatic carriers exist, by showing that those classified as such felt an improvement in their health after treatment; thus in clinical group 'a' and in group 'c' diarrhea need not be a symptom. The author would prefer to designate the disease 'Amebiasis' since 'Dysentery' is descriptive of only a small minority of cases sufficiently severe or advanced so that bloody diarrhea dominates the picture. As well as gastrointestinal disturbances with Amebiasis, constitutional and nervous symptoms may be presented.

The author feels that a patient presenting vague ill-defined symptoms should be studied for amebiasis just as they are for T.B., diabetes, syphilis, brucellosis, and neuroses.

Although sigmoidoscopic examination and culture methods are useful in establishing a diagnosis they should be auxiliary to direct examination of the warm post-cathartic stool. Complement fixation reactions is helpful but is positive only when liver involvement occurs. Hepatitis without abscess formation may exist.

The author finds difficulty in choosing the best treatment and feels that not all cases require the same therapy. Adequate data for the judgment of 'Amebecides' is not available. Since none of the therapeutics is 100 per cent effective, he deems it reasonable to use combinations of drugs and comments on the use and effectiveness of (i) Emetines, (ii) Arsenicals, (iii) Iodo-quinoline cpds., (iv) Antibiotics, (v) Chloroquine.

C. A. SMYTHE

THE NATION'S HEALTH

The health record for Canada in 1951 was extraordinarily good, according to Dr. Louis I. Dublin, Second Vice-President and Statistician of the Metropolitan Life Insurance Company. The death rate was the lowest in Canada's history. This is a remarkable achievement because the eary months of the year were marked by a severe outbreak of respiratory disease.

"The death rate from all causes for Canada in 1951 is estimated at 8.8 per 1,000 population, or about 1 percent below the previous minimum recorded in 1950," Dr. Dublin reported. "This estimate is based on official records for part of the year, supplemented by more up-to-date figures for the large number of policyholders of the Company in Canada.

"Several items stand out in the year's health record. Especially notable is that for tuberculosis. Indications are that there was a substantial reduction in the death rate from the disease in 1951. The rate sets a new low and will be well under 25 per 100,000 for the first time. In the short space of only five years the rate has been cut in half.

"The record with regard to maternal and infant mortality was highly satisfactory, especially since births continued near the peak level of recent years. The death rate among infants declined to a new low and is likely for the first time to fall below 40 per 1,000 live births. This represents a reduction of more than 40 percent in the last 15 years.

"The experience for communicable diseases of childhood was favorable," Dr. Dublin said. "The death rate from diphtheria continued to fall. This disease which formerly claimed the lives of numerous infants and children in Canada is a minor factor in mortality now. The incidence of poliomyelitis was up in 1951, but well below the levels of the worst epidemic years. "The outbreak of respiratory disease early in the year raised the death rate from pneumonia and influenza. The increase among the Company's policyholders was 15 percent above the 1950 figure. Nevertheless, the death rate from these conditions was actually less than in non-epidemic years of a decade ago.

"The death rate from chronic diseases of the heart, arteries, and kidneys as well as that from diabetes was lower in 1951 than in 1950 among the Company's policyholders, despite the increase in respiratory disease previously referred to. The death rate from cancer rose slightly."

Mortality from accidents was in the aggregate higher in 1951 than in 1950 according to Dr. Dublin. Especially poor was the record for motor vehicle accidents. Available data indicate a further increase in this death toll in 1951, which bring it close to the highest point ever recorded in Canada. Accidents at home or on the job showed a moderate decline in 1951 among the policyholders of the Company.

"The health outlook for 1952 in Canada appears good," he said. "Essential factors such as good economic conditions and good medical facilities and organization favor continued health progress. The prospect will be advanced by intensified efforts to control tuberculosis and other diseases amenable to public health measures. There is, likewise, urgent need to expand the country's safety program to curb the high and increasing toll of preventable deaths from accidents."

NEWS AND NOTES

Medical Society

At the Medical Society elections held at Hart House Theatre on March third, the following candidates were successful: Ross Doyle, President; Pete Blundell, Vice-President; Lyall Moran, Secretary; Cam Anderson, Treasurer. The newly elected class presidents are C. M. Godfrey, 5T3; D. J. Vince, 5T4; J. D. Salmon, 5T5; J. A. Morphet, 5T6; J. A. Lowden, 5T7. J. G. Evans was elected President of the Permanent Executive of 5T2. The president of the M.W.U.A. is Dorothy Burton; Jim McGillivray is president of the Medical Athletic Association, while Miss Sally Sarles is president of the Medical Women's Athletic Association. The senior CAMSI representative is Dave Smith, the junior, Arnold Bayley.

* * *

The Medical Society recently presented the Toronto General Hospital with a check for $350.00 towards its building fund. The money was realized from the profits of the sale of corsages at the Meds-at-Home, and from donations of the medical students in the various years.

* * *

The long-awaited Daffydil party, originally scheduled for Feb. 7, but postponed because of His Majesty's death, was finally held at the War Amps' Hall on Feb. 27. A somewhat subdued crowd danced to the music of Len Duke and his orchestra, and reminisced about the December production of the show.

* * *

A supper-meeting of the new and old Medical Society executives was held at Coles Restaurant on Tuesday, March 18. The honorary president and secretary-treasurer of the Society, Dean MacFarlane, and Professor Joslyn Rogers, respectively, were also present. At this meeting, the final business of the old executive was transacted, while the new presented its proposed budgets.

The Medical Society has set up a student-staff curriculum committee for the purpose of bringing before the Faculty any suggestions that the undergraduates might have about desirable changes in the course. It is hoped that as many students as possible will avail themselves of this sterling opportunity of having a voice in their own destiny.

* * *

Medical Athletics: Medicine has once again won the Dafoe Cup, emblematic of Lacrosse supremacy. Its chances of winning the Eckhart Trophy for water sports are good. It is expected that Medicine will finish about third in the race for the Reid Trophy.

The final Medical Athletic Association banquet will be held on April 1st, with Dr. Cam Gray as guest speaker. The following will receive awards: Special award: D. N. Anderson, J. Knapp, and L. Smith, 5T2; R. O. Antoni, J. W. McGillivray, J. W. Dawson, R. L. Ruderman, and E. M. Roth, 5T3; R. S. McMillin, D. H. MacKenzie, N. W. Mortimer, 5T4. Those receiving Medical "M's" include: P. Freeman, P. McCarthy, G. H. Morrison, B. A. Horowitz, C. B. Henderson, J. Birnbaum, D. Y. Naruse, and W. Zatelny, 5T2; E. J. Fyffe, T. J. Sheppard, 5T3; E. M. Burrows, J. W. Digby, J. R. Gear, P. L. Morton, A. Roberts, D. J. Vince, 5T4; W. J. Hanhorn, P. G. Morse, D. R. Preston, A. Rein, W. M. Wilson, 5T5; B. Langer, W. J. McIlroy, 5T6.

C.A.M.S.I.

Because the undergraduate body has voted to have the term of office of the local Camsi representative coincide with that of the National Executive, Terry Doran, and his successor, Dave Smith, will go together to the Fall convention at Laval University, Quebec City, after which Dave will assume full responsibility as the senior Camsi representative for Toronto.

The local Camsi executive is attempting to extend the showing of Camsi films well into April.

FACULTY

Professor A. J. Elliot visited Mexico during January, to attend the meeting of the Pan American Society of Ophthalmology.

* * *

Professor C. H. Best recently addressed the Royal Canadian Institute on the subject of Medical Research in the world today.

* * *

Professor John Hamilton of the Department of Pathology recently visited several medical schools in the United States to observe their methods of cancer teaching.

* * *

Professor Robert Cruickshank of the Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London, visited the faculty during February and lectured to the final year students.

ALUMNI

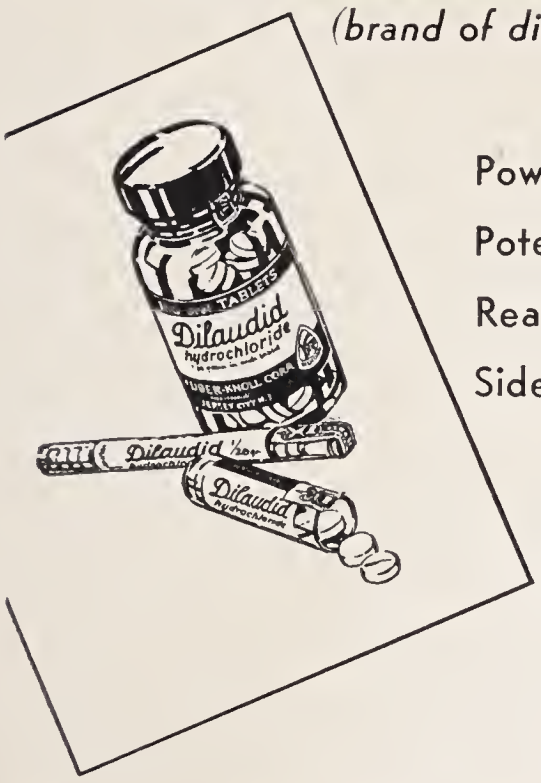
A panel discussion on General Practice was held in the medical lecture theatre of the T.G.H. on March 14, under the auspices of the Medical Alumni Association of the University of Toronto. This is the fifth consecutive year that this panel has met to bring to final year medical students, and interns, the opinions of doctors engaged in rural and urban general practice, and industrial medicine.

The large gathering of students, many of whom brought their wives, attested to the popularity of the discussion. Drs. V. F. Stock and I. Hilliard who arranged this meeting deserve a warm vote of thanks.

Dilaudid hydrochloride

(brand of dihydromorphinone hydrochloride)

COUNCIL ACCEPTED



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2. Hunter, Wilson G.; Darner, C. B.; and Gillam, J. B.: International Record of Medicine and General Practice Clinics *164*:674 (Nov.) 1951.

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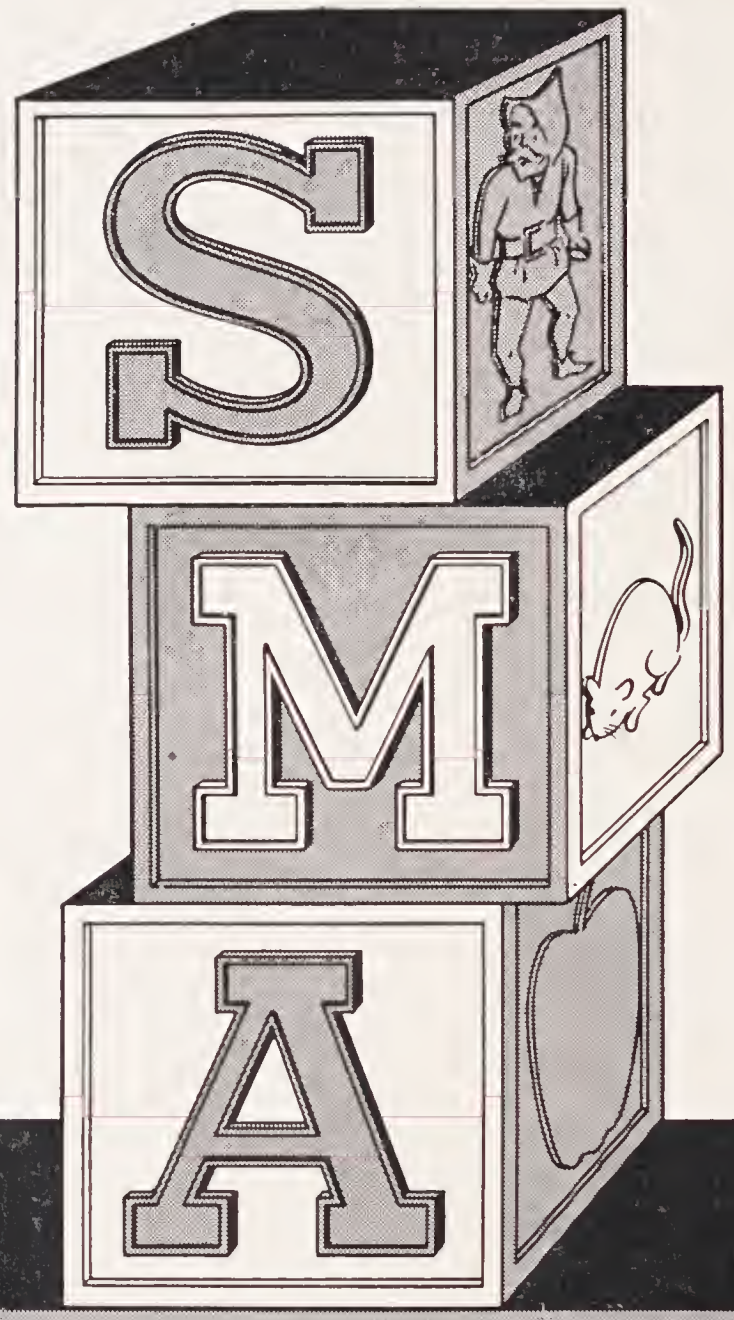

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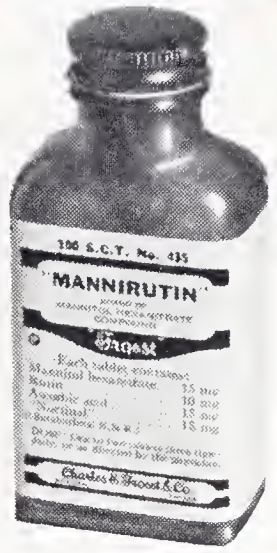

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Chronic Arthritis	8
Fibrositis	7
Bursitis	5
Chronic Rheumatism	5
Lumbago	4
Sciatica Neuritis	4
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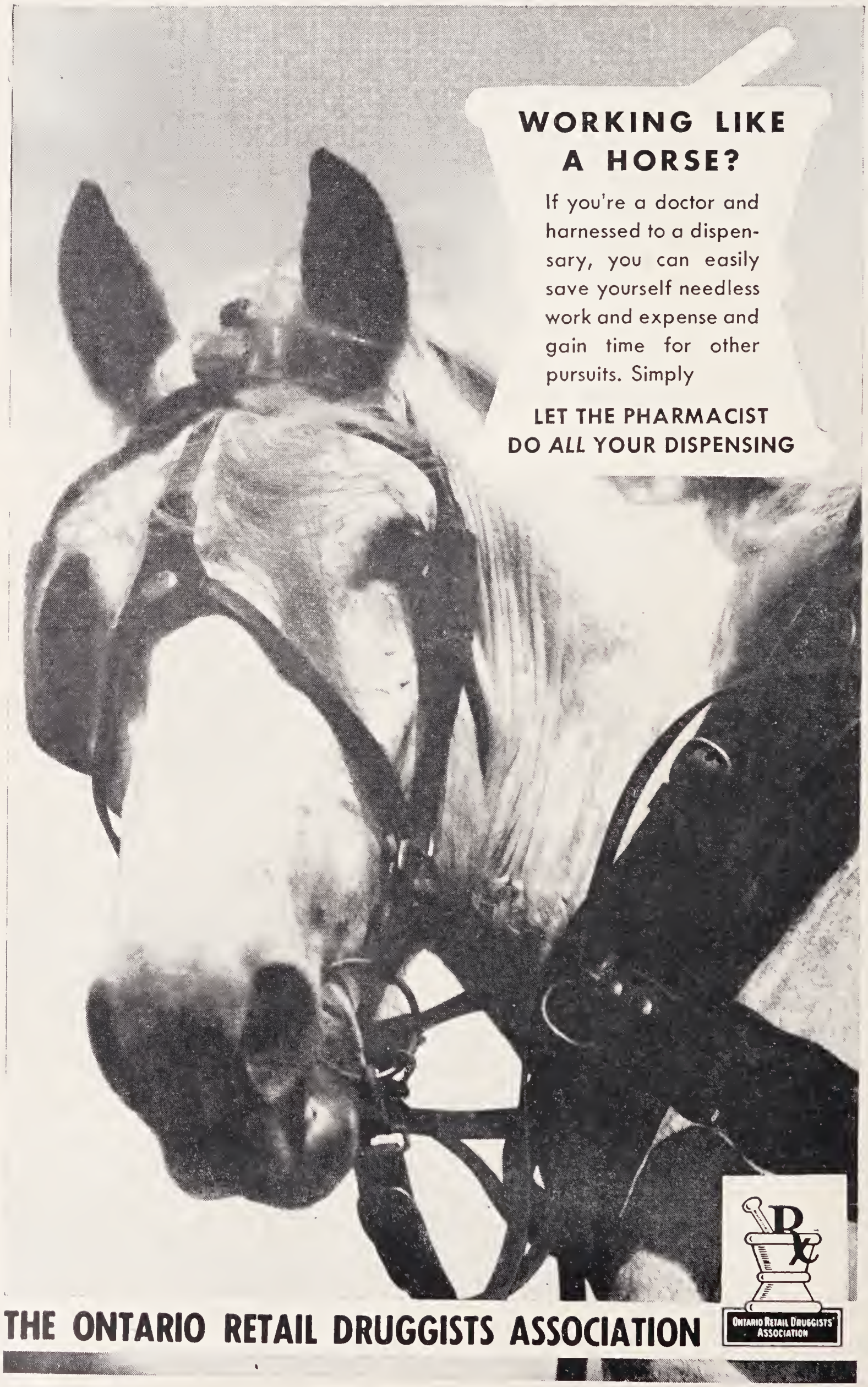
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